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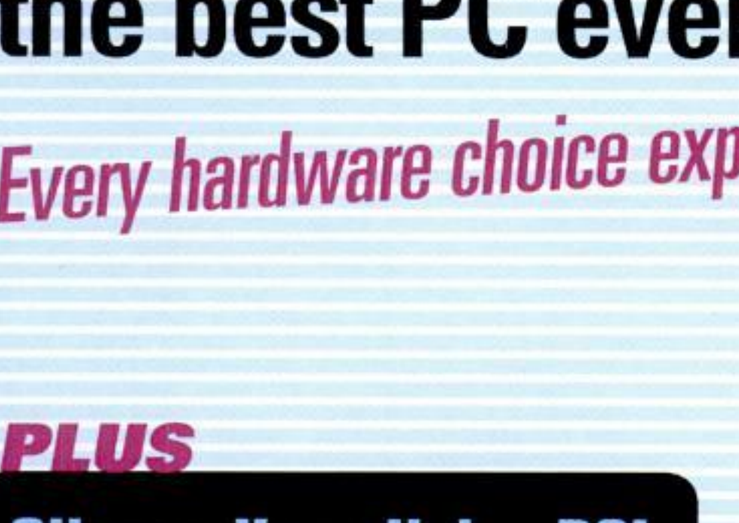

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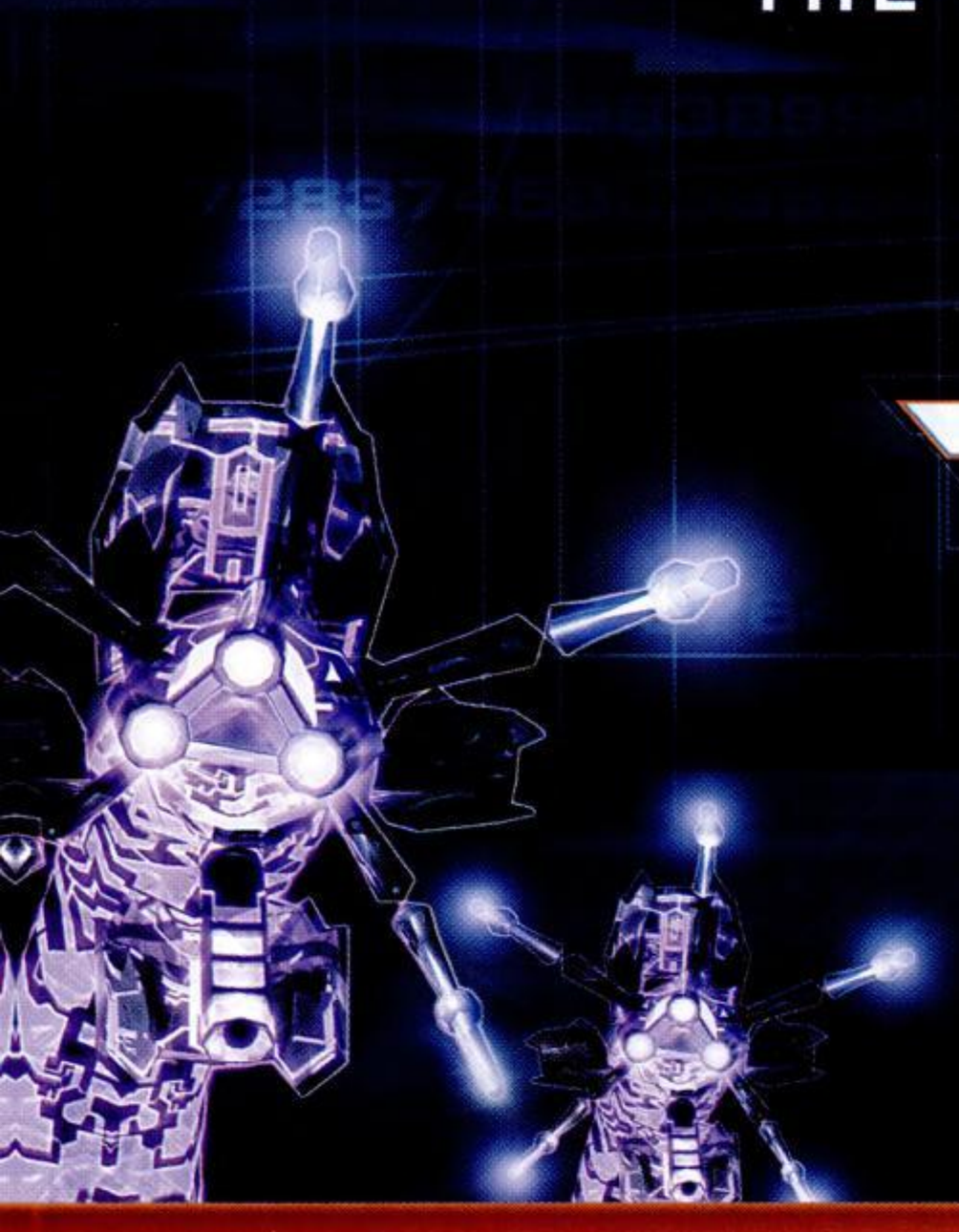

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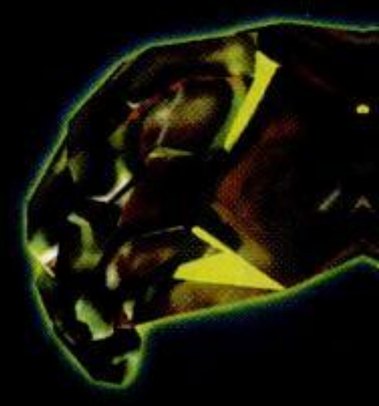

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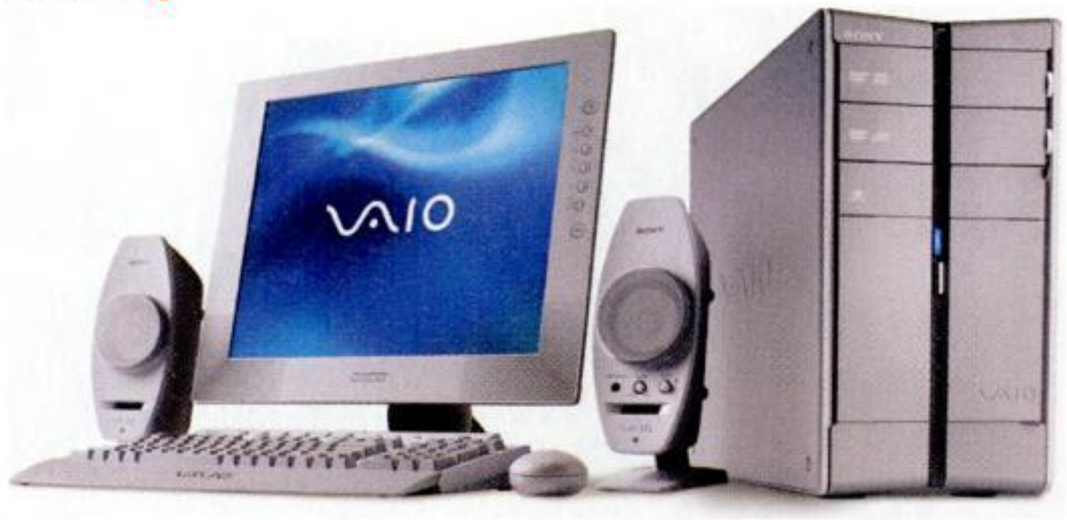

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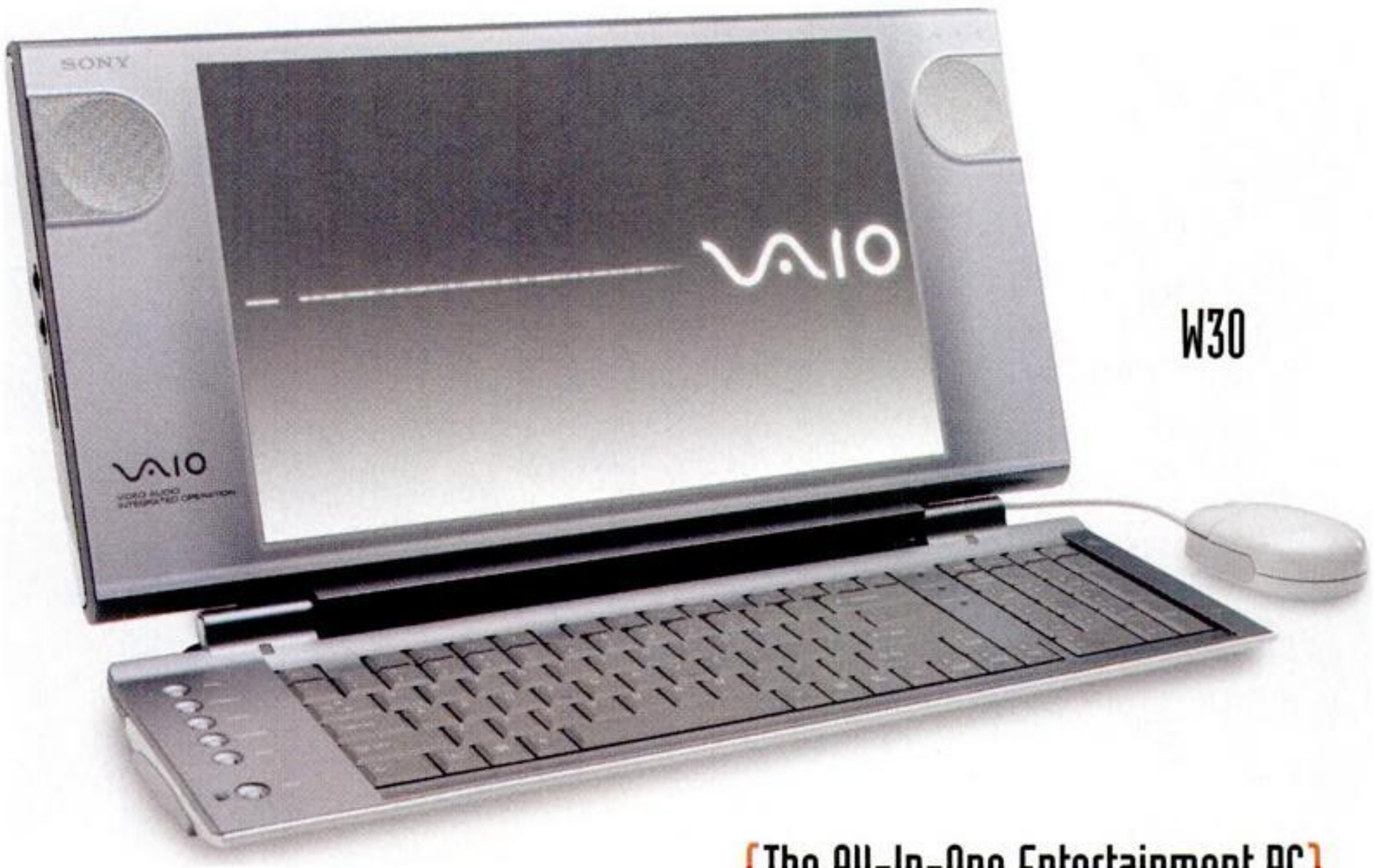

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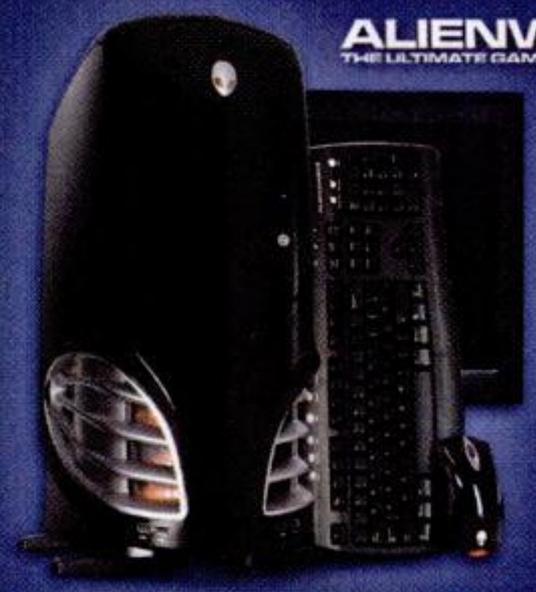

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Release Notes

If You're Reading This Now, Please Come Clean

Weird stuff can happen on computer networks. Weird stuff happened to *me*. The year is 1991. San Francisco State University, the journalism department computer lab. I'm a part-time lab monitor, paid to help beginners navigate the department's archaic Novell network. We're talking long rows of 8088 dumb terminals. Again, this is 1991. PCs aren't even PCs yet. We're still calling them "IBM clones."

So, the department secretary calls me to her office. She hands me a personal letter. Strange, right? Who would send me a personal letter addressed to the J-school computer lab? I open the letter. The contents are familiar, and *very* disturbing.

What we have here is a type-written document, and I do mean type-written. Metal keys on ribbon, ink smudges, old-school. It's a type-written copy of a *WordPerfect* file—a personal letter to an old girlfriend—that I had hidden in a password-protected account on the network's server about six month's earlier. Again, this is 1991. Conventional e-mail doesn't yet exist. My intention was to write the letter, print it out, and snail mail it to Sweden. But I never sent the letter. I never even printed it out. I deleted it about two weeks after my initial save.

So I'm looking at this type-written copy, and it is *weird*. Misspellings (not mine), coffee cup rings, even some penciled-in math notation in the margin. I feel sick. The letter is personal, and no one was ever supposed to have seen it. The words are essentially mine, but someone has lifted them, sat on them for six months, and thrown them back in my face. I'm being taunted.

I check for a return address. There is a return address. Some place in Utah. Sounds like the name of restaurant. I call Utah's local 411, and get the joint's phone number. I call up. The woman who answers tells me I've called a truck stop. I ask if she has any computers on-site. She tells me no computers. Even the cash register is mechanical.

Freaky stuff. Freaky, freaky stuff. Had one of my coworkers orchestrated an elaborate ruse to mess with my head? Or was this some kind of intra-continental hack job? And what's the significance of the return address? I have a vision of a teenage kid, looking at my words on his monochrome screen, and then re-typing them, word for word, more or less, into an old Underwood typewriter. Once again, this is 1991. University journalism departments aren't too concerned with network security. I shouldn't be surprised by the violation, should I?

Flash forward to 2003. Network security is on every admin's mind. Holes have been closed, but our personal information is still of great interest to strangers. Who's looking at your Kazaa shared folder? The RIAA? What's in your Kazaa shared folder? Bad stuff? Read the article on page 12, then think about all the weird things that can happen when you put a piece of yourself on a computer network.

—JON PHILLIPS

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Mark Madeo PHOTO EDITOR
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CONTRIBUTING EDITORS
Tom Halfhill, Dwight Looi
Thomas McDonald, Robert Moseley

CONTRIBUTING WRITERS
Jason Compton

PRODUCTION
Richard Lesovoy PRODUCTION DIRECTOR
Lawrence Briseno PRODUCTION COORDINATOR

ADVERTISING
Chris Coelho PUBLISHER
Bernard Lanigan EASTERN AD DIRECTOR
212.768.2966 EXT. 4001
Dave Lynn WESTERN AD DIRECTOR
949.360.4443
Stacey Levy NATIONAL SALES MANAGER
925.964.1205
Sharon Kiernan DIRECT SALES MANAGER
781.416.2018
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415.656.8536
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415.656.8313
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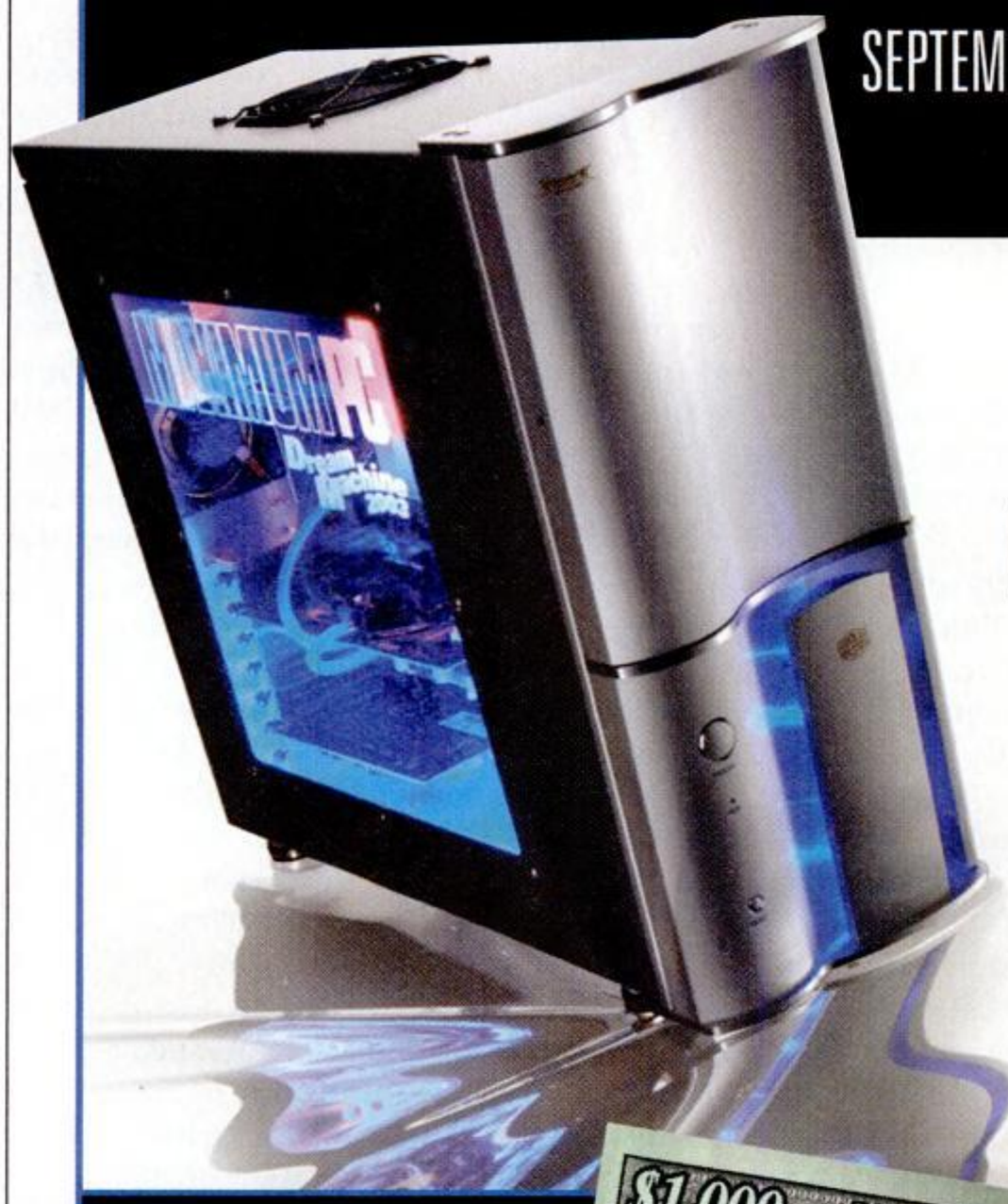
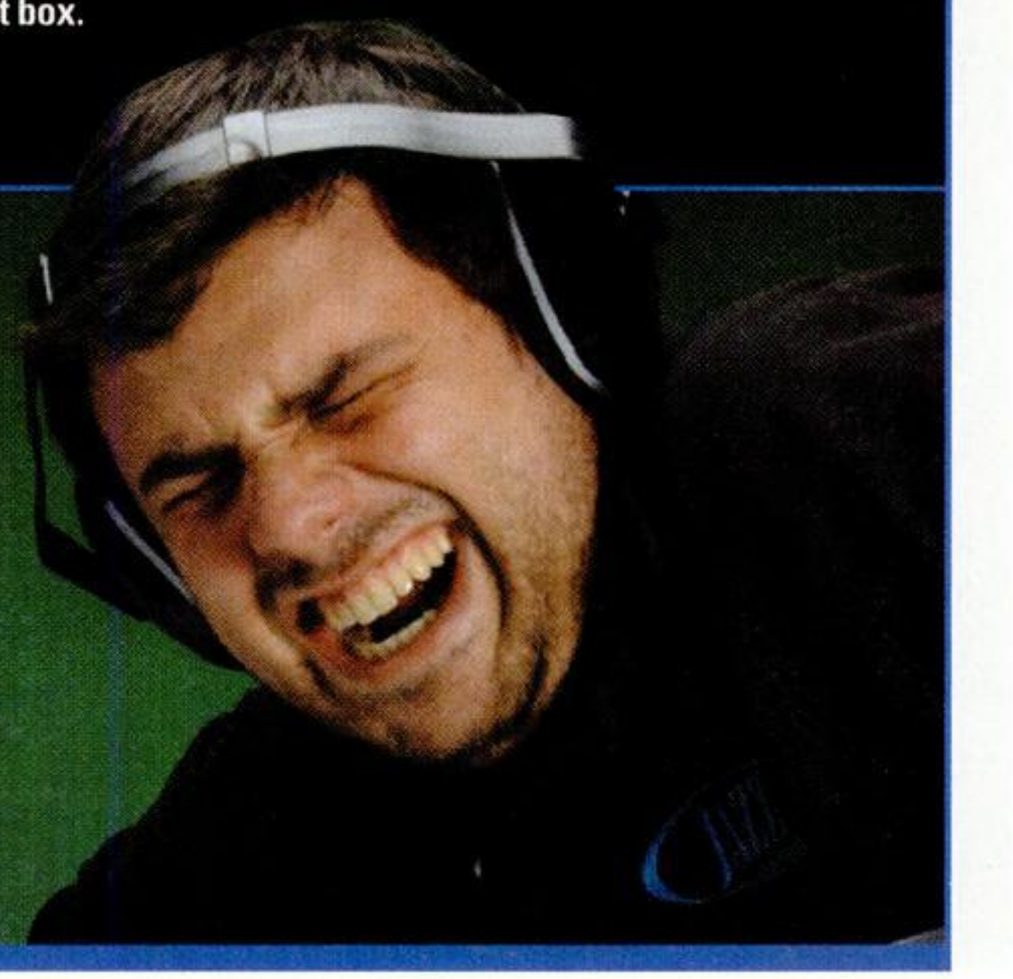


24 Dream Machine 2003

The Maximum PC Lab proudly presents its *ultimate* hand-built creation: Nineteen power parts that work together in perfect PC harmony. Follow our buyer's guide to build your own at home!

39 Lean Machine 2003

One thousand dollars—that's all it costs to build a damn respectable budget box. Our config cannot be disputed!



42 Quiet Your PC

PCs should be seen, and not heard. Check out our comprehensive guide to turning the lion's roar of your PC's fans into barely audible mouse squeaks.

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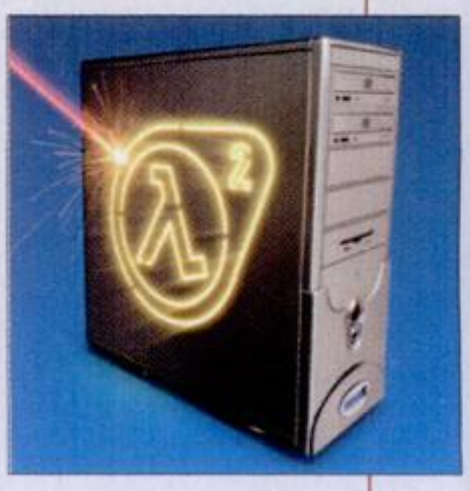
In/Out

You write, we respond

UH, HAVE YOU TRIED LOOKING ON EBAY?



Two questions: What kind of case is on the cover of the August 2003 issue, and where can I buy one?

—CHRIS COLLINS

EDITOR-IN-CHIEF JON PHILLIPS REPLIES: That case, my friend, exists only in the imagination of 3D artist Oliver Wolfson. The case has not been approved for airflow or structural rigidity, but it certainly gave our imaginary laser one hell of a fight.

AND NOW FOR A QUICK WHITE PAPER ON BUMP-MAPPING

I read your great article on *Half-Life 2* [August 2003], and thought I should correct you on a fairly important omission. The article mentions bump-mapping using grayscale images to control the bump/displacement level. While this was the norm up until now, Valve, working with *Softimage XSI*, is actually generating "normal maps," which far more accurately define a "bump." The normal map actually defines the direction of the high-res polygon bump, so lighting effects are far more realistic.

Basically, a high-res model is created, using a very cool tool in *Softimage XSI*. The normals of the high-res model as well as the tangents of those normals are baked into a texture and vertex map. Using programmable GPUs, those maps are transferred into the game engine creating the amazing lighting effects you see. Normal maps are one of the coolest things I have ever seen, and will redefine how games are created for the next several years.

—MARK SCHOENNAGEL, Senior 3D Animator, Softimage Los Angeles

BUT CAN YOUR SOUNDCARD HANG?

Just finished reading your article about how my videocard will handle *Half-Life 2*, but what about sound? I want it to look good, but I want it to sound good, too. Will there be something that will tell us about the sound specs for this game?

—J. JOHNSON

TECH EDITOR WILL SMITH REPLIES: *Half-Life 2* will support DirectSound3D, which means that any soundcard with good DirectSound3D drivers, in conjunction with a 4.1, 5.1, or 6.1 speaker rig, should give you sufficient positional sound in the game.

LIFESTYLES OF THE RICH AND GEEKY

Brad Nichols wrote to complain about your use of the term "geek" and its connotations [August 2003]. You should have pointed out what head Lockergnomie, Chris Pilliro, recently said: "Geek USED to be a four letter word... Now, it's a SIX FIGURE word!"

Personally, I don't mind being called a "geek" when [the name callers] fall thankfully to their knees after I've cleaned out the porn sites from their URL lists.

—DOUG BOHEMAN

HELPFUL CORRECTION NUMBER ONE

In your article "DSL Unraveled" [July 2003], you posted a question on how to host your own services. One requirement you state is that a static IP address is needed. While a static IP may be easier to use, it's not needed. There's a nice little service out there called Dynamic DNS Service Providers. It works by installing a small program that sends your temporarily assigned IP to their DNS servers. All you need is to pick a domain or sub domain name, and you're off and running. Best of all, most of the providers offer their entry-level service for free!

—JERRY OELKE

HELPFUL CORRECTION NUMBER TWO

In the article "Enter the BIOS" [August 2003], you suggest obtaining the BIOS manufacturer and revision number for your PC during the boot process, noting that the information "will be apparent just briefly before it vanishes... If you miss some of the information, just reboot and try to catch it again." A method I've found useful is to simply hit the Pause/Break key when this BIOS screen first appears. This will halt the boot process. After you've recorded all the info you need, just hit Enter to resume booting.

—CHAD MARKSBERRY

> ***"THE EFFECT OF LN2 CONTACT WITH SKIN IS INSTANT FROSTBITE. IT BREAKS THE CELL STRUCTURE OF THE FLESH, AND THUS DESTROYS IT."***

HELPFUL—NO, MAKE THAT DIRE WARNING NUMBER ONE

I was surprised to see a quick quip in the July 2003 issue on the use of Liquid Nitrogen (LN2) as a coolant for PCs. You properly pointed out that it is dangerous stuff. I have worked with LN2 for nearly a decade, and until six months ago, I handled it almost daily. LN2 can kill, you failed to mention that. I do so here.

LN2 is approximately -200° C, and can cause severe burns if not properly handled. If one thinks dry-ice is cold, consider that LN2 is about 100 degrees colder. The effect of LN2 contact with skin is instant frostbite. It breaks the cell structure of the flesh, and thus destroys it. Yet, LN2 burns are not what make it deadly.

If you seal a container with LN2 inside, you will cause an explosion. LN2 in a sealed container can generate pressures well into the 10,000psi range. The stronger the sealed container, the greater the explosion. No doubt, people learn this lesson every year as they attempt to save LN2 in a thermos with the cap on. Further, in some situations, LN2 in contact with other compounds or electricity can generate explosive volatiles. But the explosiveness of mishandled LN2 is not the only deadly possibility.

Though N2 gas is lighter than air, the cold vapor sinks due to its high density. This effect has killed in the past, as nitrogen vapor moves to a low spot (say, someone working under a subfloor) and displaces the oxygen. With enough LN2 vapor, one can displace the air in a room. It doesn't take as much as one might think. One CC of LN2 can displace more than 8 liters of air. How many people transport LN2 in a hot car with all the windows rolled up? Not many, as a long enough trip would be fatal.

Treat LN2 with respect.

—C. T. ADCOCK

EDITOR-IN-CHIEF JON PHILLIPS REPLIES: Wow. And we thought a leaking water-cooling system was the end of the world!

EXCLUSIVE CONTENT IS NOTHING NEW

I just read the response from Jon Phillips about how no *Maximum PC* readers support the EA/nVidia "The Way It's Meant to be Played" program, but I, for one, do.

Just because one company decides to make software with optimizations for one videocard brand does not mean it's the devil. If you are against nVidia because of this, we must all

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rally against ATI too. In the newest release of DivX 5.05, the DivX player's main screen has a large "optimized for ATI" logo on it. And how long have games supported one type of hardware API over the other? Glide over D3D? OpenGL over D3D? Many games were unplayable on some videocards.

Yes, PCs are not the console market, but what is so wrong with exclusive content? Intel has long had instructions—SSE2, SSE, and MMX—that work only in optimized programs, so buying Intel has been necessary to get that extra speed from the software.

Best Buy does it, too: Exclusive levels for people who buy cretin games from Best Buy. No uproar there. People are just whining because they don't understand that this has been going on forever.

—M. SPARKY

SYNTHETIC VERSUS REAL-WORLD: FIGHT!

A general question: When consulting the mobo benchmark chart in the August issue, how is it that the best P4 configuration crushes the best Athlon configuration in the *SiSoft Sandra 2003* INT and FLOAT tests by nearly 100 percent, but then just squeaks by in tests such as *3DMark2003* Overall and many of the real-world benchmarks? Aren't all benchmarks fundamentally composed of a lot of integer and floating-point operations, with maybe some memory bandwith exercises, which the P4 platforms should excel in anyway? If the Athlon is so much slower when performing basic operations, how can it stay competitive overall?

—BEN SCHWAID

SENIOR EDITOR GORDON MAH UNG REPLIES: You've just exposed the problem with synthetic benchmarks, and the difficulty in interpreting their results.

In many ways, synthetic PC benchmarks are like automotive dynameters—they reveal the raw horsepower potential of a computer's CPU subsystem (CPU, core-logic chipset, and memory). But even a dynameter can't show you how a car will actually perform on the open road. The car's engine might be super-powerful, but wind drag, bad gasoline, cold tires, and a novice driver who doesn't know how to shift are all variables that can adversely affect the car's actual road speed.

The same holds true for PC testing. The Pentium 4 might handily trounce the Athlon XP in the synthetic dynameter that is *Sandra 2003*, but many more variables are introduced in *3DMark2003*, and thus the P4 loses its competitive edge. Some of the biggest variables can be found in coding inefficiencies. Some real-world apps are just poorly coded, or simply haven't been updated with modern code, and don't take advantage of a particular CPU's raw speed.

We run all our Pentium 4 tests with Hyper-Threading enabled. *Sandra 2003* is Hyper-Threading-aware, and thus takes full advantage of the two "virtual CPUs" in Hyper-Threaded P4s. But most real-world apps aren't coded for Hyper-Threading support. Hyper-Threading requires that an application be multi-threaded, and, for the best performance, specifically optimized for Hyper-Threading. There's no Hyper-Threading support in *3DMark2003*, and, of course, *3DMark2003* primarily tests a system's 3D graphics subsytem.

ADS ARE A GOOD THING—SERIOUSLY

I have been a long-time reader, and I have noticed that, as the months pass, the magazine is slowly being taken over by ads. Every month, there are more and more ads taking up the precious pages. I think you need to run a magazine version of Lavasoft's *Ad-Aware* program to expunge these ads from your magazine. I would love to see more reviews, previews, and information in the magazine instead of ads. It's bad enough that we have it on the Internet and on TV, but this is something that can be controlled (ermm... I think).

—NATHANIEL TETRAULT

EDITOR-IN-CHIEF JON PHILLIPS REPLIES: The number of advertising pages in a magazine determines the total number of pages in a magazine. Different magazines have different formulas to decide "ad-to-edit ratios," but all magazines have a formula, make no mistake. When *Maximum PC* exceeds a certain number of ad pages per issue, our business plan allows us to add edit pages to that issue as well (we usually increase our "book size" by eight pages at a time). Sure, we'd like to run more editorial pages every month, but paper costs would go through the roof.

What pays for extra paper? Ads! This is capitalism, love it or leave it.

Our ad sales wax and wane from month to month, but during the last year or so, our ad sales haven't fluctuated enough for us to increase or decrease our total page count. The good news is that we'll offer more editorial pages when the world economy—and thus the advertising market—improves. It's also quite possible we'll run more editorial pages during the holidays (vendors always buy more magazine ads at the end of the year).

CUT, COPY, PASTE

On page 44 of the August issue we dyslexicly referred to the Chaintech motherboard as a 9JCS Zenith when it's actually a 9CJS Zenith.

LETTERS POLICY: *MAXIMUM PC* invites your thoughts and comments. Send them to **input@maximumpc.com**. Please include your full name, town, and telephone number, and limit your letter to 300 words. Letters may be edited for space and clarity. Due to the vast amount of e-mail we receive, we cannot personally respond to each letter.

COMING NEXT MONTH IN THE BEER-BATTERED AND FRIED OCTOBER ISSUE OF MAXIMUM PC

THE ULTIMATE PC TOOLKIT!

Who makes the antivirus software that's practically bulletproof? What's the one utility you should turn to first to rescue your data from an amnesiac drive? Which firewall stands up to the most tenacious haxors? Want to know who makes the disk utility that defrags the fastest? Would you like to find out which antispam program can bring those bastard spammers to their knees?

You'll get all the answers in our guide to the best, brawniest, and most indispensable utilities for power users, as well as a look at the hardware tools you don't want to be without.

THE MAXIMUM PC HARD DRIVE HANDBOOK

CPUs and videocards might be the A-list celebrities of your PC, but which component holds every drop of your precious data? Yeah, suddenly the hard drive starts to get the appreciation it deserves. In our most extensive component white paper-cum-autopsy ever, learn everything that matters about your hard drives—from how voice coils position the heads to why rotational latency matters.

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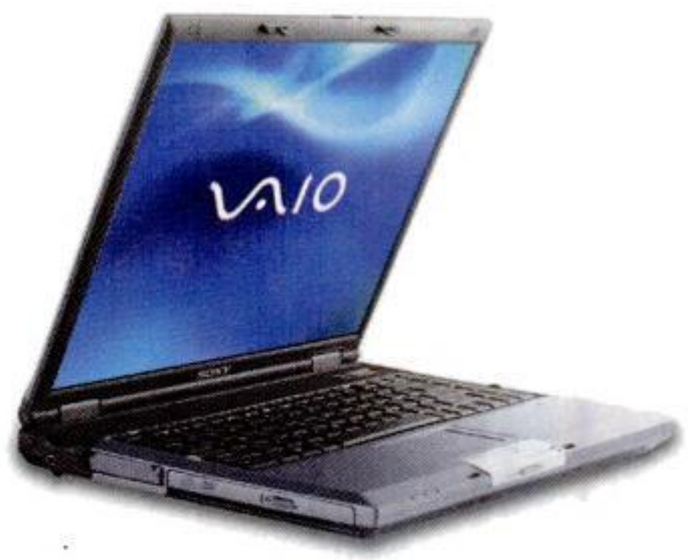

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Quick Start

The beginning of the magazine, where articles are small

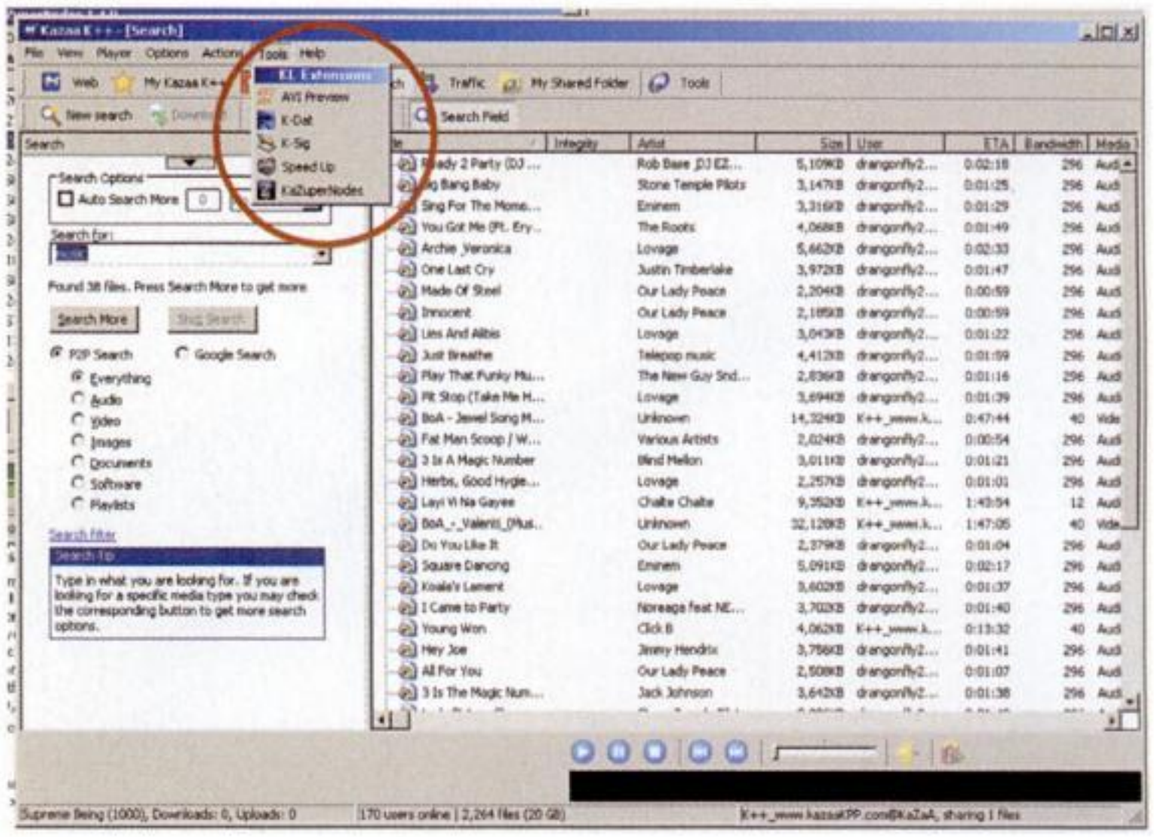
MP3 Trading Under Attack

Heightened scrutiny of peer-to-peer networks prompts the development of new sharing methods—and defenses

The Recording Industry Association of America (RIAA) has managed to stamp out one provider of file-sharing software after another, yet the practice of MP3 trading continues to grow. So now the RIAA's search-and-destroy mission is shifting focus from those who make the file-sharing software client, to those who use them.

The RIAA won an early legal battle that forced Verizon Communications to hand over the identities of suspected music pirates. Now, subpoenas seeking the identities of individual file sharers are being issued at an alarming rate. Fox news reports that roughly 75 subpoenas a day are being delivered to ISPs such as Verizon Communications and Comcast Cable Communications.

In response to the new threats, organized file-sharing networks have begun implementing countermeasures, including better identity masking and proxy services that will disguise a trader's location.



***Kazaa K++* offers a bonus tools menu with features not found in the official *Kazaa* client.**

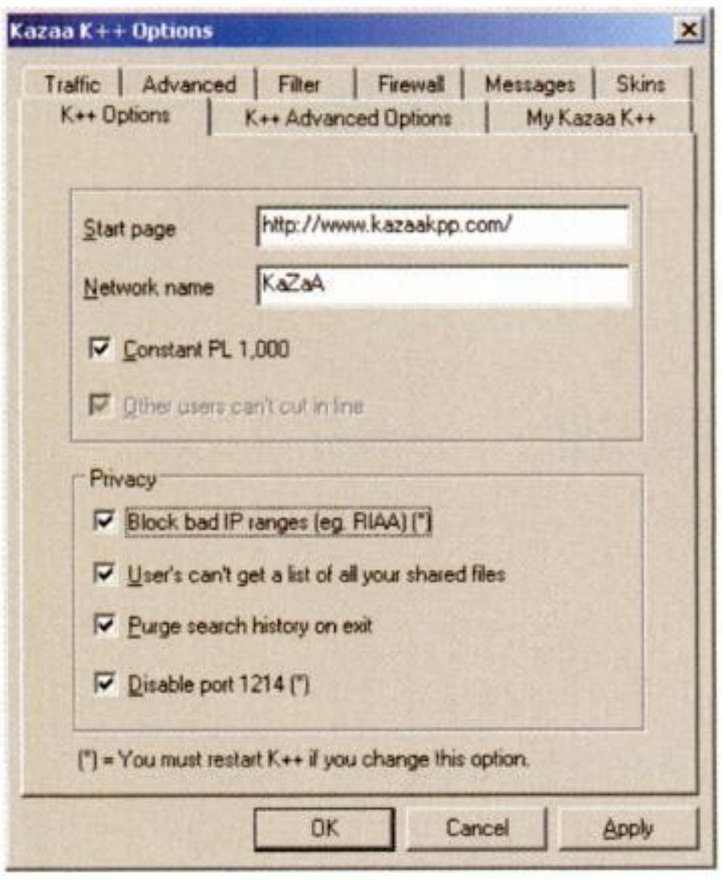
Unlicensed offshoots of major file sharing clients, such as *Kazaa Lite* (**www.kazaalite.nl**) and *Kazaa K++* (**www.k-lite.tk**), have introduced features to block known or suspected RIAA snoop clients from accessing file-sharing networks. And newly added safeguards bar a connected user from viewing a complete list of your shared files, theoretically helping you stay off the RIAA's "most wanted" list. (Unlicensed apps like *Kazaa Lite* are typically the product of a hacked and repackaged executable from the original application. These hacked versions are often superior to their legitimate counterparts because the spyware/adware components have been stripped out, and features that appeal to hardcore enthusiasts have been added.)

Entirely new file-sharing clients are taking advantage of the heightened paranoia by making anonymity-protection a key feature. *Blubster* (**www.blubster.com**) promises a "totally decentralized, anonymous network." *Earthstation 5* (**www.earthstation5.com**) claims to facilitate anonymous file sharing and offers a wealth of features that allow easy and efficient operation behind a firewall (ostensibly overcoming the obstacles that some home broadband connections encounter when transacting with a server).

More sophisticated file traders are flocking to *BitTorrent* (**bitconjurer.org/BitTorrent/**), originally intended as a means of spreading large files between corporate customers. *BitTorrent* is unique in that groups of file traders exchange parts of files with each other on the network until everyone has what they want. Each file request points to a "tracker" that doesn't know anything about the contents of the file it's tracking—music or text, copyrighted or not—other than who has the disparate parts. Because of its sudden popularity and success, *BitTorrent* is already attracting the ire of the powers that be. The *BitTorrent* client doesn't have its own search capability, so users must find web sites that list specially encoded links that tell the *BitTorrent* program where to look to start the download. Those sites have proven ripe targets for cease-and-desist orders.

Freenet (**freenet.sourceforge.net/**) has long provided a substantial measure of privacy to its users, in large part because it doesn't actually know what fragments of data its users host. The *Freenet* client requires special signature keys in order to even find a file on the network. Speed and ease-of-use are certainly issues, but for the wary, it's better than nothing.

Keep in mind, none of these new and updated clients can *guarantee* your anonymity, and the RIAA isn't the only threat you need to guard against. While hacked clients such as *Kazaa Lite* and *Kazaa K++* are well respected among diehard file sharers, there are greater risks inherent to downloading a hacked file-sharing client than an official, fully-vetted version from a company or project home site, or a major portal. RIAA aside, you should always bear in mind that typing "kazaa lite," for instance, into a search engine could present you with any number of convincing imposter sites eager to zap you with a malicious payload, be it spyware, a virus, or some other intruder.



***Kazaa K++* employs privacy options to block suspected RIAA snoops from scanning file-share machines.**

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Attack of the Wee Printers

Printers are the next target in the march toward mobility and miniaturization

The term "portable printing" meant sending your documents to the hotel fax machine until two innovative products came on the scene. When Canon's NoteJet laptop debuted more than a decade ago, it broke ground by featuring a printer built into its rump; its output looked like someone took a Sharpie pen to a wet cocktail napkin. Then came Casio's 400dpi Freedio printer, which is still available today. This palm-size printer is perfect if you want to print replicas of your gas station receipts.

Well, portable printing is now making legitimate progress. At a time when mobile technology is winning the lion's share of many companies' R&D attention, photo-quality printers are finally shrinking to portable size. HP's Deskjet 450cbi measures 13.3-inches wide by 6.5-inches deep by 3.2-inches high, and weighs just 4.6 lbs including its lithium-ion battery. It has an integrated 45-sheet paper tray and can connect through IR, Bluetooth, wired USB, or ye olde parallel port. The 450cbi offers 1200x1200dpi on black text documents, and up to 4800x1200dpi on premium photo papers. The whole kit with battery runs $350.

With the Desktop 450cbi, a laptop, and photo-quality paper, you can open your own little PhotoMat just about anywhere.

Before you slap down the plastic, however, Canon would like you to consider the i70 color bubble jet printer. It's even slightly smaller than the 450cbi at 12.4-inches wide by 6.9-inches deep by 2-inches high, and weighs in at 4.5 lbs including an optional lithium-ion battery. Canon says its mini-printer can squirt out up to 13 pages per minute (black text) at up to 600x600 resolution (text) and 4800x1200 (color). Connection options are limited to IR or USB, but direct printing from Canon cameras is also available. One can be yours for $390 including the battery.

Requiring no more briefcase space than a travel Scrabble board, Canon's color bubble jet printer is eminently portable.

Finally, how does the idea of a cell phone–size printer that could, in theory at least, print a full 8.5x11 page grab you? Patented by PrintDreams (**www.printdreams.com**), a Swedish company, the PrintBrush can be swept across any printable surface (a piece of paper, an envelope, fabric). Repeated back and forth motions fill in the image while a battery of embedded sensors compensates for your hand movement. The first units are expected to hit the shelves in early 2005, for God only knows how much.

Imagine: Instant labels for your underwear waistband and an end to mix-ups at the laundromat, brought to you by the PrintBrush. No joke.

FUN-SIZE NEWS

Whose Ink Cartridge Is It, Anyway?

Lexmark doesn't want people to buy cheap replacement cartridges for its printers, so its cartridges are installed with a special chip intended to prevent such shenanigans. But then Static Control Components foiled Lexmark's scheme by making chips that could fool Lexmark printers into thinking cheaper cartridges are Lexmark-authorized. So Lexmark shot back by suing Static Control, using the Digital Millennium Copyright Act (DMC) as its billy club. But there's a nice ending to this sad story. Legislation has been drawn up in North Carolina that gives printer owners the right to refill any printer ink cartridge. If other states adopt similar bills, it could dramatically affect how printers are priced because manufacturers won't be able to screw consumers with expensive "consumables."

SCO Says Linux Is Pirated

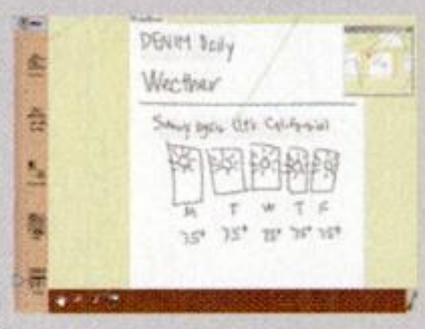
"Since the year 2001, commercial Linux customers have been purchasing and receiving software that includes misappropriated UNIX software owned by SCO," said Chris Sontag of the SCO Group in a recent press release. But SCO is giving Linux users everywhere a second go by offering them the opportunity to license their software through SCO under terms that have yet to be announced. "While using pirated software is copyright infringement... we intend to provide [Linux users] with choices to help them run Linux in a legal and fully-paid-for way," said Sontag.

DVD-R Is 'Most Compatible'

Using 27 stand-alone DVD players, 20 DVD-ROM readers, and eight different media types, the web site CDR-Info has posted the results of the most comprehensive test of recordable DVD media compatibility we know of. The conclusions: DVD-R is the most compatible format (at 96.74 percent), with DVD+RW being the least compatible format (at a none-too-shabby 86.96 percent). For details on the testing parameters, specific drives tested and media brands used, go to **www.cdrinfo.com** and search the site for DVD Media Format Compatibility Tests.

Draw Your Web Site with Denim

Lots of applications claim to help you easily design your own web site, but with *Denim*, it's as simple as drawing one. Intended for the early stages of web design, this free app allows you to sketch out a preliminary design complete with hyperlinks, and offers Tablet PC support for doing so right on the screen. Check out a *Denim* mock site or download the app and try it yourself at **http://guir.berkeley.edu/projects/denim/**.



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Machinima Goes Mainstream

Music Video Uses Quake III Engine

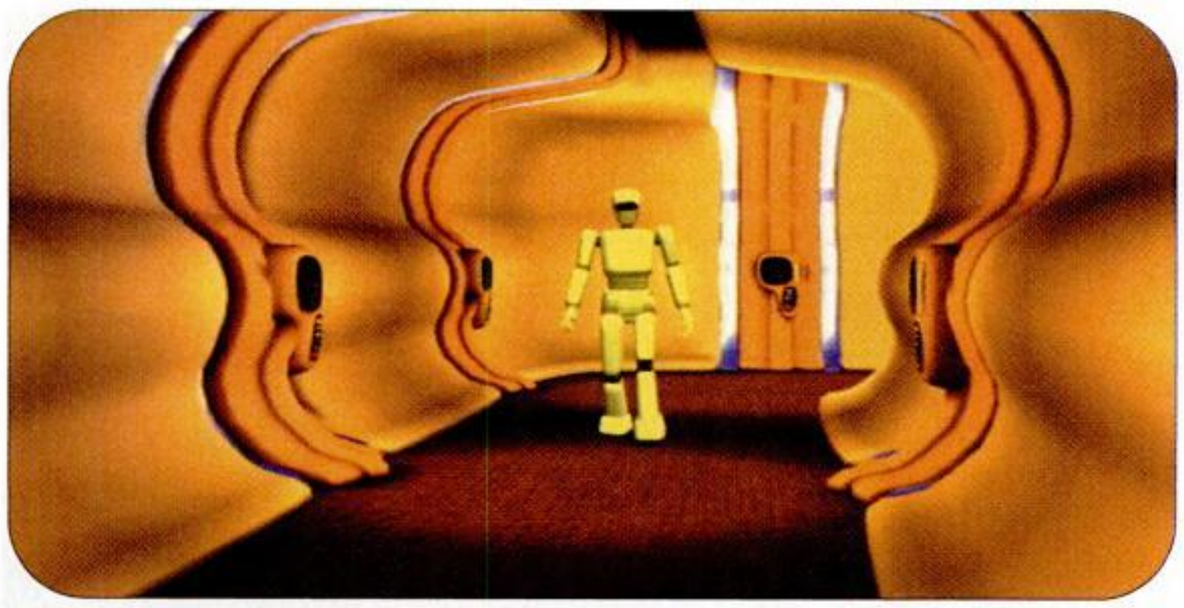
Zero 7 is a British electronica duo whose chill-out record *Simple Things* has been described as "soundtracks for the movies in your mind." *Quake III* is a brutal shooter in which unfortunate players are blasted into six or seven chunks of red meat. In a pairing scenario more incongruous than finding Hilary Clinton and George Bush in the same hot tub, Zero 7 and *Quake III* are coming together in a video for the song "In the Waiting Line."

It's all courtesy of Machinima. Machinima, as you might recall from a previous Quick Start story, uses game engines and in-game footage as the foundation for scripted, animated films. In this case, the story is about a lonely robot traveling through outer space, and it provides the visuals to accompany Zero 7's second single.

The video was directed by Tommy Pallotta (who also produced Richard Linklater's animated film *Waking Life*). Models were initially created in *trueSpace*, then exported to *Maya* for conversion to the Quake MD3 format. Once all the models and "sets" were ready, the real-time animation was choreographed and captured using Machinimation tools from Fountainhead Entertainment (**www.fountainheadent.com**).

Kick back with some video and audio clips at **www.zero7.co.uk.**

The entire music video to Zero 7's "In the Waiting Line" was created with *trueSpace* models and the Quake III game engine. We can't wait for the next record—perhaps they'll use the engine from *Half-Life 2*.



FAST FORWARD BY TOM R. HALFHILL

Stop Waiting For Nanotechnology

How long will it be until everyday products like PCs use nanotechnology? Most experts say 10 or 20 years. However, I would argue that nanotech is right around the corner, if not already here.

Nanotech is commonly defined as atomic-scale engineering. That means building things out of individual molecules or atoms. It's already been done in labs, although the examples generally fall into two categories: cute demos ("IBM" spelled out with tungsten atoms) or very simple mechanical structures (carbon nanotubes, gears with a few teeth, basic logic gates). But I believe that the PC processors we'll soon buy are virtually nanotech devices, too, because their smallest structures are already smaller than many molecules and verge on the atomic scale.

Intel's Prescott, a Pentium 4 variant coming this fall, will be manufactured in a new chip-fabrication process that shrinks the circuit feature size to 90 nanometers (nm). That means the smallest line the lithography equipment can etch on the chip is 90 billionths of a meter wide, and optical trickery makes it possible to produce even smaller features. The transistor's gate length—the gap that makes it an on/off switch—is just 50nm. The gate oxide, or insulating layer, is a mere 1.2nm thick. In electron-microscope photos, you can clearly see the individual atoms in the gate oxide, and the average thickness of the insulator is only five atoms.

I call that atomic-scale engineering. Others would classify it as incredibly refined integrated-circuit technology, not genuine nanotechnology. However, the difference isn't so much the technology; it's the manufacturing. Manipulating individual atoms with an atomic-force microscope is a neat lab trick, but it's woefully unsuitable for mass production. Intel is building more than 60 million of these tiny transistors into every Prescott processor and will sell millions of the chips every year. Just because Intel builds the gate oxide with a relatively conventional manufacturing process doesn't change the fact that the layer is only five atoms thick, or that a whole transistor is roughly the size of a DNA molecule.

Indeed, the insulator is so thin that the transistor leaks electricity due to a strange effect called quantum tunneling—subatomic electrons seem to randomly teleport to another location. Fortunately, the leakage isn't significant enough (yet) to short out a circuit and crash your PC, but it's there.

So, are today's chips early examples of nanotech or just very advanced high tech? I'd say we're splitting hairs—except that a human hair is a whopping 100,000nm thick, and we're way past that point.

Tom Halfhill was formerly a senior editor for Byte *magazine and an analyst for* Microprocessor Report. *He is now a technical writer/analyst in Silicon Valley.*

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Hunting Down Hot Spots

Kensington's got a bloodhound for Wi-Fi access points

Wardriving—the practice of driving around town, identifying wireless access points—fell out of style when people realized they had better things to do than help other people find free wireless access wherever they went. So now you're on your own.

No problem. Kensington is introducing a new handheld device that can tell you if you're sitting on a hotspot. Just push the button on the Wi-Fi Finder, and the device will sniff out any 802.11b or 802.11g signals from up to 200 feet away from the source. Three lights indicate signal strength, and the Wi-Fi Finder is able to filter out noise coming from cordless phones, microwave ovens, and Bluetooth connections.

While fools fumble with their laptops trying to figure out if they've got wireless access, you can find out with the press of a button.

Didn't the Terminator Wear These?

Ingineo's Eyetop glasses can give you a personal head-up display

The problem with the biggest massively multiplayer game of all—life itself—is that you don't get updated stats on the people you meet. Who is this person? How old is she? Single or married? How many hit points does she have?

Interested? The Ingineo Eyetop glasses (**www.eyetop.net**) might someday provide all this information, and more.

The glasses put a virtual, transparent viewscreen between you and the world. You can still see where you're going, but one side of the glasses has a half-inch active matrix LCD screen embedded in the side. The Eyetop glasses plug into a small control unit that you can carry in your pocket or wear under your beret. From there, plug in any device with composite A/V connectors (such as a portable video player, digital video camera, or portable DVD) and the incoming image is merged into your field of vision.

Now you really can wear sunglasses at night: The Eyetop's virtual screen can be viewed in daylight or in the evening.

While the Eyetop may be limited to incoming video (audio is not supported), we can easily imagine the future possibilities. Walking down the street, and framed above the head of an approaching fair young lass, we see in green text, "I'm Lisa, I'm 29 years old, single, and if you touch me, I'm going to kick your ass."

GAME THEORY

BY THOMAS L. McDONALD

Can You Relate?

Online games are all about relationships. Granted, most of these are crappy relationships, on par with the psycho chick you dated in high school who broke all your Black Sabbath records, but they're relationships nonetheless: Relationships among gamers, and relationships between the gamer and the publisher.

The participants in these relationships have different motivations. The gamer sinks $10 to $15 a month into an online game to get a more dynamic gaming experience. Rather than playing with or against impersonal AI, you play with an impersonal human being, who's probably far away, possibly unwashed, and generally too busy gaming to have much time for more sophisticated interaction. Still, live gamers *do* make a game more interesting. They're unpredictable, and often easy to piss off, making them a rich source of amusement.

Publishers have a much simpler motivation. In designing their games, the core goal is simply to keep people playing, and thus paying. It's in their interest to provide an experience that adds enough extra value to make it worth a monthly subscription, and that's dense enough that gamers need to extend their subscriptions to get to the good stuff.

All of this goes a long way toward explaining the two-week free introductory period for *Legacy Online*, from Sega and Oceanus. It might actually take more than two weeks of average play-time to realize that this game, in fact, sucks, and by that time you're $9.95 poorer and little wiser.

I'll kindly limit my critique to the fact that no game yet has had less reason to be massively multiplayer. *Legacy* is little more than *SimCityLite* with *Capitalism* posturings. It pretends to be a business sim in which you use starting capital to build a corporate empire. Not the best subject matter for a massively multiplayer game, but it could work. After all, hundreds of players building competing retail outlets and mucking about with a dynamic economy might make for an interesting (albeit dry) experience.

But that would require *Legacy* to offer competition and an economy. It doesn't. There are so many industries to choose from, and individual maps are so small that there is little reason to wage a cutthroat war for, say, the toy market. It's easier, early on, to simply pick a market with little competition and watch the bucks roll in. Then, of course, there's the hilarious notion of an economic sim without an economy. At least not a real economy, since *Legacy* has no capital markets and thus no investments, stocks, or the other things that make this sort of game worthwhile. Add to this *zero* detailed charts and no way to see and tend to your holdings other than physically visiting each and every building (and there can be well over a hundred after just a couple days of play time), and you've got yourself a business sim designed by people who don't seem to

Tom McDonald has been covering games for countless magazines and newspapers for 11 years. He lives in the New Jersey Pine Barrens.

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Head2Head

A showdown among natural PC competitors

THIS MONTH: Dual-Format DVD Burners

Until late last year, manufacturers have been standing firmly behind one of the two mainstream recordable DVD formats, either DVD+R/W or DVD-R/W. But that's changing now, due to an unexpected consequence of the DVD format wars: product returns. Consumer walks into a store, buys a DVD-RW drive, and then picks up some DVD+RW media on his way out, not realizing that the two different standards are incompatible. The disc won't work in the burner, so the whole kit and caboodle is brought back to the store for a refund. Bad for the manufacturer. Bad for the retailer. Bad for the consumer. Oops!

So now dual-format drives reign supreme, and the standards war is effectively over. But which drive's the best? For this toe-to-toedown, we decided to pit Pioneer, the manufacturer of the first recordable DVD burner priced for consumers, against Sony, the first company to release a dual-format DVD burner. Let's get it on!

—LOGAN DECKER

SONY DRU-510A

Writes to:	
DVD+R	4x
DVD-R	4x
CD-R	24x
Rewrites to:	
DVD+RW	2.4x
DVD-R	8x
CD-RW	16x
Reads:	
DVD-ROM	12x
CD-ROM	32x

CD performance: Sony got the numbers right: 24x CD-R and 16x CD-RW write speeds are far more appealing than Pioneer's dull 16x CD-R and 10x CD-RW ratings. But, frankly, the difference isn't all that impressive when it comes to testing. The Sony posted a 40-second advantage in CD-R burning, and a 1.5-minute advantage in CD-RW burning.
Winner: Sony DRU-510A

Ripping: Both of these drives easily hold their own against traditional CD burners when it comes to extracting digital audio from CDs. But the DRU-510A stumbled on the final track of our 74 minute-plus CD, throttling down to 7x and falling behind the DVR-A06 by almost 20 seconds.
Winner: Pioneer DVR-A06

DVD burning: The Sony engineers are going to need some toilet paper to stick up the bloody noses they got from this round, because they lost to Pioneer in every DVD burning benchmark (write-once *and* rewriteable). Although the DRU-510A's packaging says the drive will write to DVD+RW at 4x, that's a typo. The real speed is 2.4x, the same as with Pioneer's drive (and Sony lost in this category too when it came to actual benchmarking; perhaps the bundled software was to blame).
Winner: Pioneer DVR-A06

Software: The main software titles that come with both drives are functionally almost identical. Sony's *RecordNow DX* isn't as easy to use as Pioneer's *Nero*, but *MyDVD 4.5* supports fancier DVD-Video menu creation options (such as groovy motion backgrounds) than Ulead's *MovieFactory*.
Winner: Tie

BY THE NUMBERS SONY DRU-510A	DVD	CD
Average data transfer (MB/sec)	8.2	3.7
Random/full-stroke seek (ms)	151/286	122/283
Audio extraction (min:sec)	N/A	3:28
CPU utilization	15% (2x)	5% (8x)

MAXIMUM PC VERDICT 8

+ T1
Good burn times to DVD and decent CD speeds in one foxy looking case.

– T2
Burn times aren't at the top of its class.

$310, www.sony.com

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PIONEER DVR-A06

Writes to:	
DVD+R	4x
DVD-R	4x
CD-R	16x
Rewrites to:	
DVD+RW	2.4x
DVD-RW	2x
CD-RW	10x
Reads:	
DVD-ROM	12x
CD-ROM	32x

MAXIMUM PC KICK ASS PRODUCT

Ripping: Don't get us wrong: We'd rather Sony's drive throttle down its speed at the end of our test disc than deliver a bad rip. But what we like even more is that Pioneer's DVR-A06 kept its cool at the outer edge of the CD (where high-speed ripping is most difficult), and delivered flawless digital audio extraction.
Winner: Pioneer DVR-A06

DVD burning: As the benchmark charts demonstrate, Pioneer absolutely *pulverized* Sony, so let's not belabor the point. What's particularly interesting is the DVR-A06's speed at transcoding files (converting them to the proper format) and burning them to a DVD-Video disc. If our test video had been two hours long instead of just one hour, the difference would have been even more striking.
Winner: Pioneer DVR-A06

Software: Ulead *MovieFactory* doesn't have some of the fancy features of Sonic's *MyDVD 4.5*. But instead of forcing you to figure out which program does what (as Sony's bundle does), Pioneer deals out all the DVD options in a single, efficient, plain-English interface. Plus, you get Ahead's *Nero*, which is always a good thing.
Winner: Tie

CD performance: We're vexed by Pioneer's surprising fumble in this category. OK, we've noted that the difference between 16x and 24x isn't mind-blowing, but why not opt for the higher speeds? That would help for the occasional disc-to-disc copy.
Winner: Sony DRU-510A

MAXIMUM PC VERDICT 9

+ T2
The valedictorian of DVD burners—great burn times across the board.

– T3
CD burn times are slow, and couldn't they dress up the bezel a wee bit?

$300, www.pioneerelectronics.com

BY THE NUMBERS PIONEER DVR-A06	DVD	CD
Average data transfer (MB/sec)	13.2	3.7
Random/full-stroke seek (ms)	129/301	126/287
Audio extraction (min:sec)	N/A	3:10
CPU utilization	14% (2x)	5% (8x)

BURN TESTS (bolded result indicates winner)	SONY	PIONEER
DVD data +R (4x)	14:59	**14:23**
DVD data +RW (2.4x)	22:36	**22:13**
DVD data –R (4x)	15:40	**14:20**
DVD data –RW (2x)	29:35	**28:17**
DVD-Video	16:07 (DVD+R)	**9:14 (DVD-R)**
CD-R data	**4:54**	5:34
CD-RW data	**6:15**	7:45
Digital audio extraction	3:28	**3:10**

The data DVD burn test uses the bundled applications to create a 4.25GB data DVD. The data CD burn test uses the bundled applications to create a 700MB data CD. The data CD-RW burn test uses the bundled applications to create a 647MB data CD-RW. The DVD-Video burn test uses the fastest format in each drive and the bundled applications to transcode and burn an MPEG-2 video that's slightly more than one hour to a DVD-Video disc. The audio-extraction test uses a commercially stamped 74:31 audio CD.

THE UPSHOT

As one manufacturer after another began lining up behind the DVD+R/W format, Pioneer's DVD-R/W drive started to look an awful lot like a wallflower. But Pioneer has made an impressive comeback with the dual-format DVR-A06. Both drives in this battle are excellent, it's just that the DVR-A06 is better. For now, that is. We expect to see 8x drives in the first half of next year, and the company that pairs an 8x DVD controller with a 32x or faster CD-R controller will have our immediate attention. ■

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WatchDog

Say hello to Bodie, WatchDog of the Month.

Maximum PC takes a bite out of bad gear

THIS MONTH: The WatchDog goes after...

>Spam Scammers >X-Dream Machines >USB 2.0 >MusicMatch

Look Before You Leave

The Dog has said it before, but will say it again: You might want to check the product box before you leave the store. From DVD boxes devoid of DVDs to videocards that aren't what the package indicates, there seems to be a rash of consumers getting burned these days.

In one extreme case, a reader purchased what he thought was an ATI videocard, but once home, he discovered an ancient nVidia card inside the shrink-wrapped package. Human error notwithstanding, the Dog is certain ATI would never put an nVidia videocard in one of its boxes. So how does the wrong card end up in a shrink-wrapped box? It's likely the work of an unscrupulous customer who swapped the card out and shrink-wrapped the box. Sadly, the only way to prevent this from happening to you may be to open the box either in the store or once back at your car. Some vendors, such as VisionTek and AMD, now use clear plastic packaging so you can actually see the components while you're in the store.

BestBuy.com Spam Scam

If you receive an e-mail claiming you've been a victim of credit card fraud, think twice before responding.

Clever scammers have taken fraud to a new level with a tactic that combines spam with scam. An unknown number of people worldwide received a spam message this summer claiming they had been victims of credit card fraud at BestBuy.com's web site. The e-mail directs the person to BestBuy.com's "fraud alert" web site for more information. The link in the e-mail, however, doesn't take the person to BestBuy.com, but rather to a web site expertly disguised as BestBuy.com. Once there, the person is asked to enter his or her credit card number, social security number, mother's maiden name, and even ATM pin numbers.

This may look like an authentic Best Buy web page, but it's actually a ruse in a crafty scam to defraud consumers.

While e-mail spam scams aren't new, FBI Agent Paul McCabe told the Dog, this one is in a class of its own.

"The difference in this one is how elaborate it was," McCabe said. Even the most vigilant person would've probably been fooled by the look and feel of the site. Clicking the BestBuy.com logo on the fake page, for example, would take the person to the real BestBuy.com, which helps support the illusion that the customer is actually at the official BestBuy.com web page.

> *"SCAMMERS HAVE BEEN USING A NEW SCHEME TO GATHER CONFIDENTIAL INFORMATION FROM UNWITTING CONSUMERS."*

How many people fell for the trick? The total is unknown, but Agent McCabe said the FBI's Internet Fraud site (www.ifccfbi.gov) received at least a few hundred complaints. Not all were victimized, but complaints came from all over the U.S. as well as overseas. In this case, McCabe said, Best Buy helped mitigate the harm.

"The damage could have been a lot worse if Best Buy didn't respond so fast," McCabe said. Upon learning of the scam, Best Buy posted a pop-up to warn its customers of the scam and immediately contacted the ISPs where the bogus pages were posted to have them removed. Exactly how did the scoundrels recover the data? McCabe wouldn't elaborate on details because of the ongoing investigation, but he did say the information was captured as victims filled out each page. McCabe said victims should immediately contact their credit card company and also keep tabs on their credit history for the next few years. It's not known whether the scammers will use the information for identity theft or credit card fraud. Victims should also file a complaint at the Internet Fraud Complaint Center (www.ifccfbi.gov) or with their local FBI office.

Of course, the larger issue is that scam artists are increasingly using sophisticated social hacks

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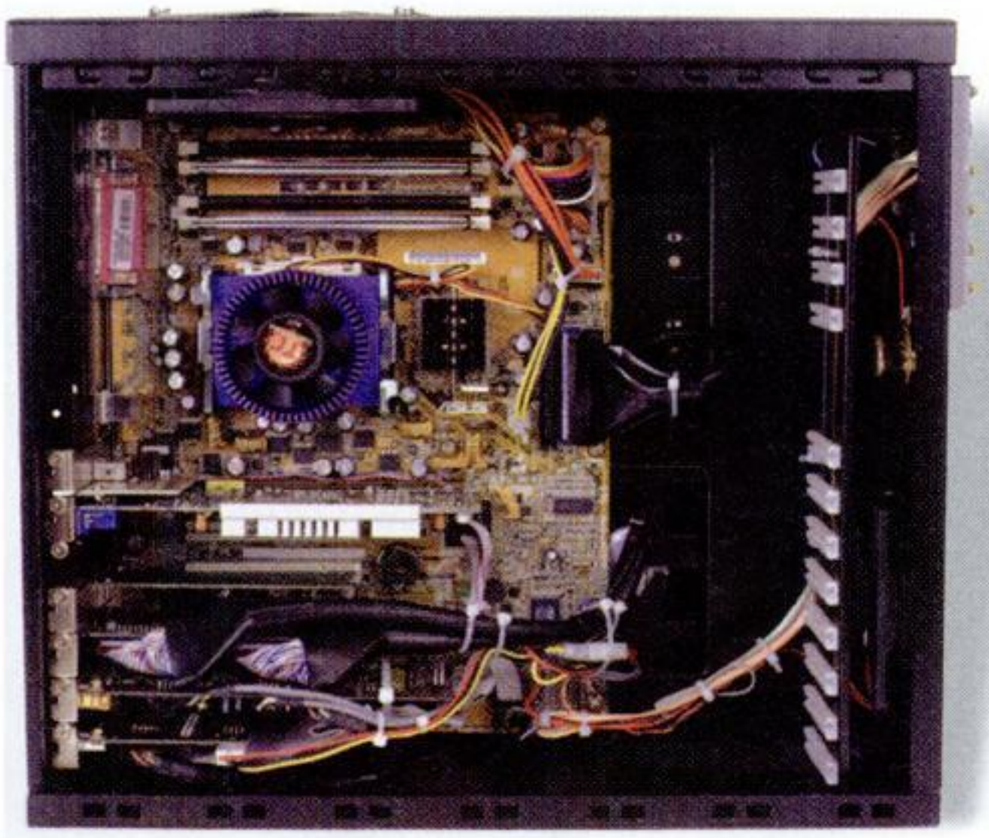

Is X-Dream Machine missing in action?

to fleece people of confidential information. eBay.com was itself the victim of a similar scam scenario. And it's not hard to imagine a web page masquerading as, say, PayPal, where you'd unquestioningly enter your account name and password. With scammers casting ever-wider nets, consumers need to be hyper-vigilant about divulging confidential information.

X-Dream or Nightmare?

DEAR DOG: I purchased a custom system from X-Dream Machines in February 2002. It was a liquid-cooled system and the pump broke.

As it was still under warranty, I returned the system to the vendor last month for repair and an upgrade of the videocard. While I was waiting, I found myself unable to contact the vendor. My phone calls, a fax requesting an update on my system, and a separate e-mail to the salesperson have all gone unanswered.

As of today, the web site is inoperative, and I'm afraid I may be unable to retrieve the $5,000 machine I returned to the company. Please help!

—DAN OGDEN

THE DOG RESPONDS: X-Dream Machines' web site (www.xdream-machines.com) was still offline when the Dog checked, and its phone number disconnected. Phone calls to the home of company president Henryk Terlecki went unanswered as well.

Prior to this incident, the company had earned a fairly good reputation with consumers. There were no complaints on file with the Better Business Bureau, and the company had a favorable standing at ResellerRatings.com. Fortunately, just when it looked like Dan was SOL, the company shipped back his system fully repaired. The fate of the company, however, is still unknown. According to an e-mail Dan received: "We do not know the future of X-Dream Machines. We are in the process of a complete reorganization."

Oliver Stone's USB 2.0

DEAR DOG: I read a story in the *Bangkok Post* that said the USB forum is trying to pull a fast one on consumers. According to the story, the forum changed the rules on what can be called USB 2.0 so PC vendors can continue to sell machines with USB 1.1 and call them USB 2.0. Can you shed some light on this because I think the USB forum really blew it.

— DARON MCINTYRE

THE DOG RESPONDS: The Dog read the story Daron is referring to on the *Bangkok Post's* web site, and it indeed accuses the USB implementers forum of engineering some pretty dark deeds: Because consumers were passing on USB 1.1-equipped PCs in favor of PCs with USB 2.0, the USB forum allegedly agreed late last year to call everything USB 2.0. That way the older PCs with USB 1.1 ports could be sold to unwitting customers.

It's a conspiracy that should piss off every consumer—if it were true, that is. Even the most die-hard conspiracy theorist on staff couldn't quite fathom the likelihood of this actually happening. After reviewing documents on the USB forum's web site (www.usb.org) and interviewing forum members, the Dog believes the group was actually trying to do just the opposite of what it's been accused of. When the USB 2.0 spec was introduced, most people equated it with high-speed transfers. But because the USB 2.0 spec encompasses three transfer speeds: the "low-speed" 1.5Mbps, the "full-speed" 12Mbps, and the "hi-speed" 480Mbps, it's possible to have a fully compliant USB 2.0 device that only supports transfer rates of 12Mbps. The USB forum told the Dog that the loose terminology allowed some companies to package low-speed devices as USB 2.0-compliant, which isn't entirely untrue.

To alleviate this mess and help consumers understand what to buy, the forum posted nomenclature guidelines that eliminate the numbering scheme altogether. Savvy tech consumers should look for the Hi-Speed USB logo. Low- and full-speed devices like mice and keyboards will likely carry the basic USB logo because they don't require the maximum bandwidth.

Daron's got a right to be frustrated, though. The whole mix-up could have been avoided from the beginning if the USB forum had set clearer guidelines earlier. It'll take some months to stop using the term "USB 2.0," but it's better in the long run.

Music(Mis)Match

DEAR DOG: Several years ago I purchased online the lifetime updates key for *MusicMatch Jukebox Plus*. On several occasions I've had to uninstall and reinstall the program due to typical PC difficulties, but the key always remained available. Recently, I had to reinstall Windows 98, and this time the key was lost. Over the last three weeks, I've attempted to contact MusicMatch via the various means posted on its web site, with no response. (Of course, there isn't a phone number to reach an actual person.) I constantly hear great things about this company, but this is definitely making me consider a new program.

—CHUCK BORTSCHELLER

> ***"IT'S A CONSPIRACY THAT SHOULD PISS OFF EVERY CONSUMER—IF IT WERE TRUE, THAT IS."***

THE DOG RESPONDS: The Dog contacted a MusicMatch official who had the company reissue Chuck's key. The Dog also learned that MusicMatch recently discovered that some people who had paid for "Lifetime Free Upgrades" were incorrectly issued single-version keys, meaning the keys would not function beyond the original version. MusicMatch has since reactivated those keys so they will work on newer versions of the program. Woof. ■

Consumers who are interested in the fastest USB hardware should look for the Hi-Speed USB logo (left), not the older basic USB logo (right).

Got a bone to pick with a vendor? Been spiked by a fly-by-night operation? Sic The Dog on them by writing **watchdog@maximumpc.com**. The Dog promises to get to as many letters as possible, but only has four paws to work with.

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YOU WILL NOT LEAVE THESE HALLS AS YOU ENTERED THEM.

YOU WILL UNLEARN ALL THAT YOU HAVE LEARNED.

DEDICATE YOUR LIFE TO A HIGHER PURPOSE.

USE THE KNOWLEDGE YOU ATTAIN HERE WISELY.

THE FORCE IS A POWERFUL ALLY. AND A TERRIBLE FOE.

DO NOT BE SEDUCED BY THE DARK SIDE.

FOR YOU ARE THE FUTURE GUARDIANS OF THE GALAXY.

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You are a new student at Luke Skywalker's Jedi Academy. Continue an ancient tradition as you learn the powers and dangers of the Force. Customize your character. Construct your own lightsaber from handle to blade. And develop your fighting stance–from the classic single-blade to the rare and powerful staffsaber. Then hone your Jedi skills in single player missions or fight it out in multiplayer modes. May the Force be with you, young Jedi.

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PC CD-ROM SOFTWARE

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Best PC Ever

We proudly present Dream Machine 2003, the very finest hand-configured PC that money can buy

After seven years of building our annual Dream Machines, we can testify that the process never gets any easier. Hardware breaks. Tempers flare. Someone unsheathes a Leatherman multi-tool in anger, and the next thing you know, we're dividing the Lab in two because one editor couldn't convince another editor that soda pop makes a damn fine liquid-cooling agent.

And, of course, every year we scramble for extra development time in order to add that single component that will push our Dream Machine over the edge. Just one more week. Just one more frickin' week, and that coveted, top-secret part will arrive.

True to form, Dream Machine 2003 gave us one big Rolaid of a good time. We didn't impose any price restrictions on this year's machine, so we reached for the absolute best components available in every parts category. Some parts choices were no-brainers. Other choices were the result of day-long debates. And some component choices—such as our videocard decision—were so damned close, we might as well have flipped a coin.

And after much soul searching, we're still wondering if we made all the right decisions.

Last year, readers demanded exotic cooling. This year, we oblige with a unique cooling system that not only chills our components for ambitious but stable overclocking, but also fits inside our oh-so-portable case—something you just can't do with any of the phase-change systems available today.

We give you Dream Machine 2003, the ultimate desktop PC for home enthusiasts. It was well worth the internecine fighting.

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Absolute power corrupts, absolutely.

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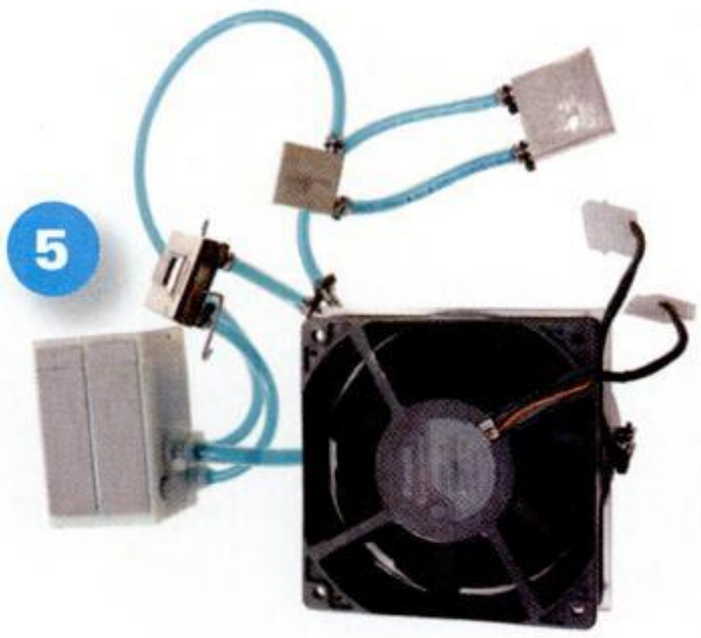
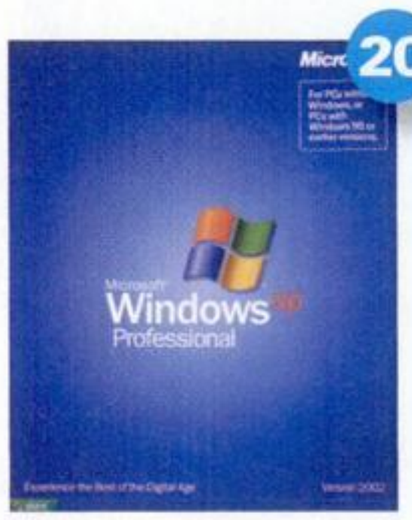
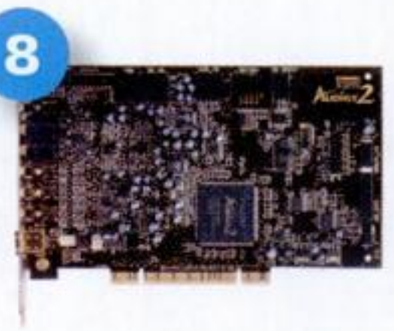
Flat-Out Awesome

This is what DM2003 would look like if it suddenly exploded, and all its parts landed in some type of logical placement, flat on the Lab floor.







These photos are not to perfect scale

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THE DAMAGE

1. **CASE:** Cooler Master TAC-T01*	**$350**
2. **POWER SUPPLY:** PC Power & Cooling Turbo Cool 510 Deluxe	**$289**
3. **CPU:** 3.2GHz Pentium 4C	**$700**
4. **MOBO:** ABIT IC7-G	**$150**
5. **COOLING:** Voodoo F-1 Liquid Cooling **	**$300**
6. **MEMORY:** Two 512MB sticks of Corsair Micro XMS4000 (CL2)	**$400**
7. **VIDEOCARD:** nVidia GeForce FX 5900 Ultra	**$500**
8. **SOUNDCARD:** Sound Blaster Audigy 2 Gamer	**$65**
9. **CD-RW DRIVE:** Plextor Premium 52/32/52	**$130**
10. **DVD BURNER:** Pioneer DVR-A06	**$300**
11. **MEDIA READER:** Atech Pro-9 Multiple Flash Card reader	**$39**
12. **10,000RPM HARD DRIVES:** Two 36GB WD Raptors	**$300**
13. **7200RPM HARD DRIVES:** Two 250GB WD Special Edition Caviars	**$800**
14. **CRT MONITOR:** Sony F520	**$1,700**
15. **LCD MONITOR:** Sharp LL-T2020B	**$4,300**
16. **SPEAKERS:** Logitech Z-680 5.1s with DTS support	**$300**
17. **KEYBOARD:** Key Tronic LifeTime	**$29**
18. **MOUSE:** Logitech MX700	**$55**
19. **CABLES:** Black Hole Cables BlackFlash Special Edition Network cable; BlackFlash Onyx power cable; and miscellaneous ATA/SATA cables	**$78**
20. **OS:** Windows XP Pro	**$200**
TOTAL	**$10,985**

* this price includes $150 for laser-etched window,
** estimated price

Call us spoiled, but we think a price tag just a tick under $11,000 is pretty darned inexpensive for a Dream Machine project conceived without any price ceiling at all. The prices on this page represent the common retail prices found online during DM2003's creation. When prices weren't available, we went with MSRPs. Get out your plastic, Wally, because it's time to go shopping...

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Our Parts in Detail

Case: Cooler Master Wave Master TAC-T01

The *Maximum PC* staff begins every Dream Machine project by carefully selecting the PC's foundation: the case. Sure, the motherboard we choose is important, because it determines the rig's technological profile. But the case informs the Dream Machine's personality, its spirit, its mythic nature—the "dream" itself. And so after much searching we found greatness in the Cooler Master TAC-T01. This mid-tower ATX enclosure includes bays for six 3.5-inch drives (five of which are internal) and four 5.25-inch drives.

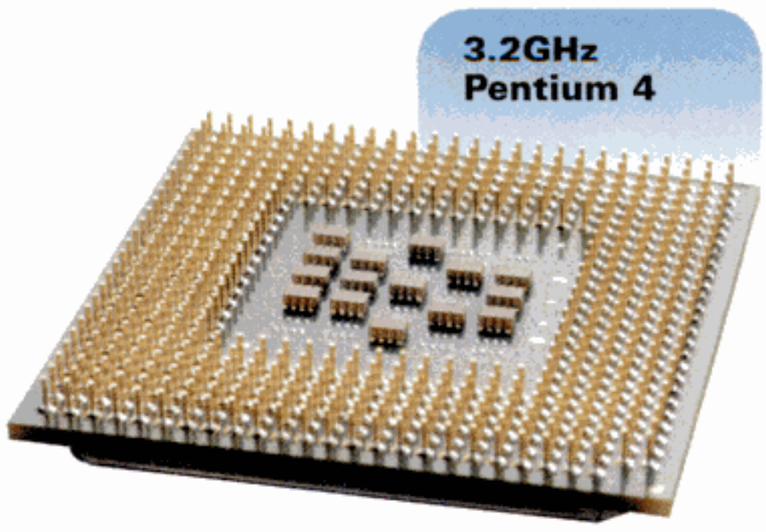
As curvaceous as a young Liz Taylor, the TAC-T01 is indeed a sight to behold. But the case is also fairly compact, and outfitting it with all our dream componentry would prove to be a challenge. First, our exclusive Voodoo cooling apparatus consumed more case space than we anticipated, so Will Smith had to do a Dremel job on our CD-RW drive (this is explained in detail on page 30). Second, because the TAC-T01 has just a single front intake fan and a single rear exhaust fan, several case modifications were required to improve internal airflow. See the top blowhole outfitted with a 120mm exhaust fan? This is a custom addition. That blowhole region was previously occupied by an I/O cluster featuring FireWire, USB, and mic ports. An additional intake fan was also added to the bottom of the case, and the result is improved airflow over our hard drives.

Competing case companies have cloned Cooler Master designs, but none have matched Cooler Master's amazingly sturdy build quality and overall fit and finish. If you ever get a chance to compare a Cooler Master with a generic aluminum case, you'll understand why these bad boys can cost two to three times as much. **www.coolermaster.com**

Power Supply: PC Power and Cooling Turbo-Cool 510 Deluxe

We asked an OEM engineer who had been having power supply troubles why he didn't use PC Power and Cooling PSUs. He replied that PC Power and Cooling makes fantastic power supplies, but the units are just too freaking expensive. Fair enough. It's difficult to justify a $280 PSU to the "average" consumer. But for the hardcore PC freak, a one-time splurge is worth it. And for Dream Machine 2003, the sky's the limit.

This year's Dream Machine features a 510-watt Turbo-Cool 510 Deluxe in piano black, a custom color that PC Power and Cooling will soon offer to the public. Other notable extras include expandable flexible tubing for all cabling, a port for easy access to the voltage pots for fine tuning, and *real* Serial ATA power connectors. A dirty little secret of Serial ATA is that the spec will eventually require 5-volt, 12-volt, *and* 3.3 volt power connectors. Because there's no way to plumb 3.3-volt power from the current generation of power supplies, there's a chance you'll be tossing out your PSU when the 3.3-volt power rails come in use. Our Turbo-Cool 510, however, will still be ticking along. **www.pcpowerandcooling.com**



CPU: Intel 3.2GHz Pentium 4C

When it was released at 1.5GHz, the first Pentium 4 was rightly criticized for pokey performance, but now the CPU runs at a scary 3.2GHz on an 800MHz bus, and has effectively shut the critics' pie holes. Sure, the P4 architecture is still wont to waste a few clock cycles on branch mispredictions incurred by its long, 20-stage pipeline, but who gives a hoot when those cycles are screaming by at 3.2 billion times a second?

Even our staff's diehard AMD fans have to concede that Intel's 3.2GHz Pentium 4C is firmly in charge of the processor kingdom. AMD's Athlon XP is arguably a more *efficient* CPU, but Intel's sheer clock-speed advantage (the 3.2GHz P4 runs 1,000MHz faster than AMD's top-of-class 3200+) gives Intel an insurmountable performance lead. Just check Dream Machine 2003's benchmark scores against those of the AMD-equipped Lean Machine 2003 (page 39) for evidence.

The Dream Machine's Pentium 4 was handpicked by Intel expressly for *Maximum PC*. In addition to its unlocked multiplier, our particular CPU was chosen for its rare overclocking headroom. Using Voodoo's custom cooling apparatus, we were able to take the processor to a completely stable, turn-it-on-and-forget-about-it 3.53GHz on a frontside bus running at 884MHz (221MHz quad-pumped). This frequency boost gave our rig the necessary oomph to enter Dream Machine territory, and compensated for our inability to score an Athlon 64 from AMD or a Prescott from Intel. (We pleaded with both chip companies to give us exclusive peeks at these upcoming CPUs, but they both told us to talk to their hands because their faces weren't listening.) **www.intel.com**

Motherboard: ABIT IC7-G

After nailing down the Pentium 4 as our dream processor, our chipset choice—Intel's 875P, aka "Canterwood"—was a no-brainer. With dual-channel DDR400 memory support, Communication Streaming Architecture for improved networking bandwidth, and native Serial ATA support, the 875P is *the* chipset standard for P4 machines. In fact, the 875P is so advanced, it'll probably still be Intel's preferred core-logic when the Pentium 5 arrives. (That's just an educated guess, of course. We don't even know if the new CPU will be named Pentium 5!)

While our chipset choice was easy, the question of which mobo to use demanded much more attention. We were impressed by the build and configuration of Chaintech's 9JCS Zenith, and by the performance of the Asus P4C800 Deluxe. But in the end, we picked just the right tool for the job. Because overclocking is the dominant theme of this year's project, we went with the board that provides the best chance for stratospheric frequencies: ABIT's IC7-G.

To many overclocking fanatics, ABIT *invented* overclocking by being the first mobo company to offer frontside bus controls via a software interface. Our particular ABIT board has full settings for controlling CPU, memory, and AGP voltage, as well as a comprehensive array of PCI/AGP dividers. The dividers

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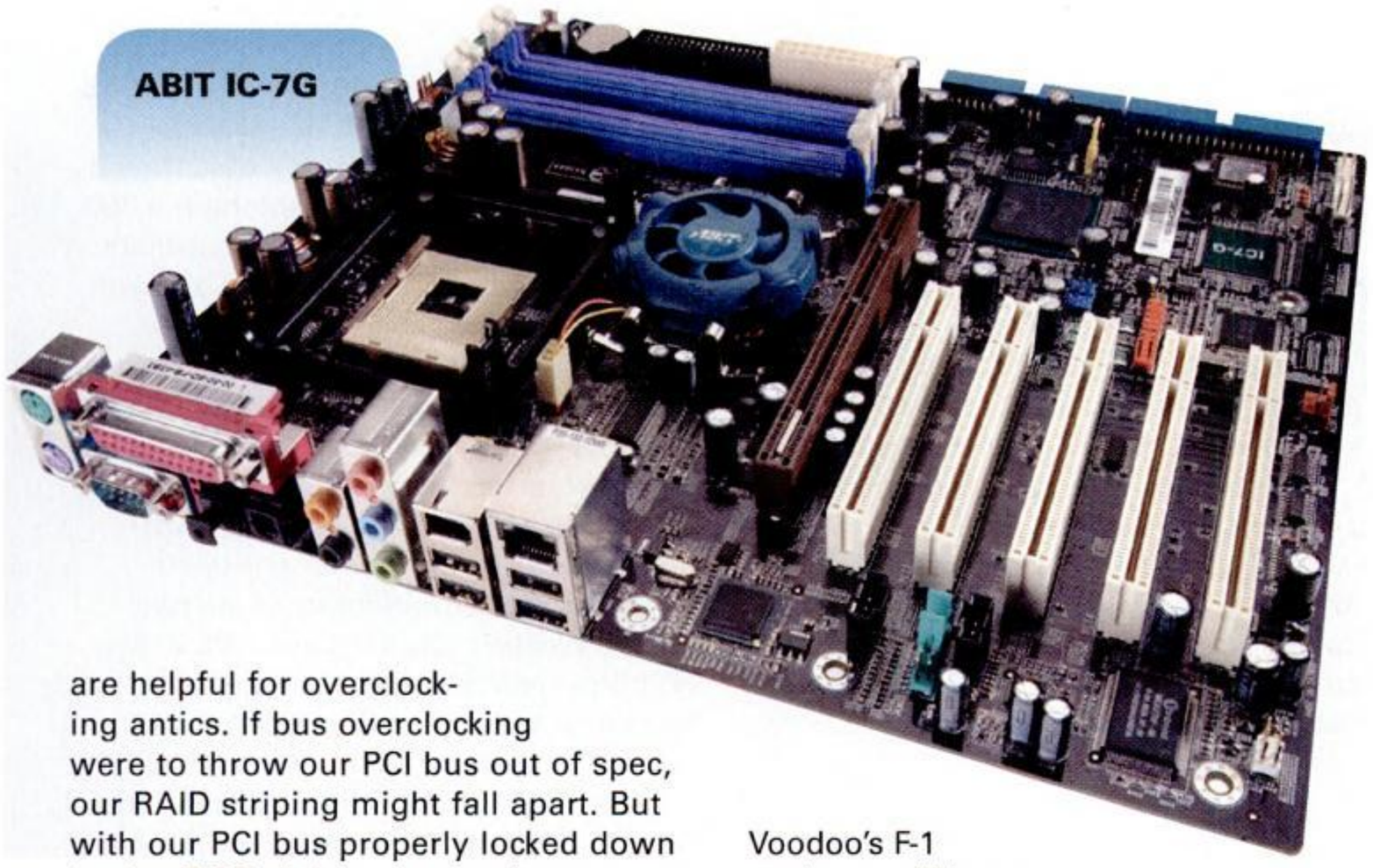

are helpful for overclocking antics. If bus overclocking were to throw our PCI bus out of spec, our RAID striping might fall apart. But with our PCI bus properly locked down by the BIOS divider, we can keep everything running smoothly.

Which leads us to the IC7-G's RAID support. With four Serial ATA ports and complete RAID capabilities offered onboard, the motherboard allowed us to run *two* RAID 0 arrays without any assistance from a PCI controller card. More about this later. **www.abit-usa.com**

Cooling: Voodoo F-1 Liquid Cooling

We first considered the ultimate cooling solution: a Slurpee machine pumping frosty slush past our sizzling overclocked components. Just think about it: ice-cold Cherry Coke churning through DM2003's interior. The very idea of such a system enchants the mind!

But, sadly, *Maximum PC* doesn't have the technology to make Slurpee cooling possible, so we turned to Voodoo PC to help us liquid-cool our rig's CPU, GPU, and videocard memory. Voodoo's F-1 cooling apparatus—designed in conjunction with Cool-It Systems and first reviewed in our July 2003 issue—is *waaay* quieter than traditional air cooling, consumes much less physical space than water-cooling systems like those featured on page 45, and looks absolutely wicked when viewed through a case window. The system's heat transfer blocks also allowed us to overclock all our parts to their full potential. Other liquid-cooling schemes cool CPUs and GPUs, but not video memory, and by cooling video memory we were able to hit an especially nice overclock.

If you want to get your hands on Voodoo's F-1 cooler, you'll have to buy a full desktop PC from Voodoo, and then extract the system from its guts. Voodoo says it has plans to offer the cooling system as a stand-alone product, but for now the technology is only available in fully configured PCs, and is ultra-secret to boot. The paraphernalia is obviously based on standard water-cooling methods, but it's unclear exactly how the water is kept chilly. We resisted the urge to disassemble the contraption, but if Voodoo doesn't provide details soon, we might have to get out our dissection tools! **www.voodoopc.com**

Corsair Micro XMS4000

Memory: 1GB Corsair Micro XMS4000

Our motherboard choice demanded dual-channel DDR memory, and our personal desires demanded two 512MB sticks that would be overclocking friendly. So, to give ourselves the best chance of hitting high clock speeds, we dialed up the folks at Corsair Micro, and requested their finest modules. Corsair was good enough to personally deliver a set of hand-picked CL2 sticks that wouldn't be available to the public for another month. In fact, Corsair hadn't even defined the speed ratings for the memory at press time, but we were told they'd break 500MHz without a sweat. We inserted the DIMMs, quite confident that better memory couldn't be had by others. **www.corsairmicro.com**

Videocard: nVidia GeForce FX 5900 Ultra

When we started making our parts list, we had just two videocard candidates: the Radeon 9800 Pro 256MB and the GeForce FX 5900 Ultra. Benchmark battles between the two cards failed to produce a clear winner, so our decision was akin to choosing either a Lambo or Ferrari. The nVidia board would win one benchmark, but the ATI board would come back to beat it in the next test.

We called our contacts at ATI and nVidia, and explained the situation. We told them we wanted the fastest, most overclockable cards they could muster—cards that would perfectly complement our Voodoo cooling system. And to make things interesting, the companies had just two weeks to deliver the goods.

The cards arrived, and headroom testing commenced. By the time we hit Exit on the last benchmark, the winner was obvious: We were able to crank the GeForce FX 5900 Ultra to a 505MHz core and 480MHz memory clock. This from default settings of 450MHz and 425MHz, respectively—and *without* the aid of Voodoo cooling.

When we plugged our hand-picked videocard into the Dream Machine's liquid-cooling system—which cools the GPU core as well as the DDR-II memory chips on *both* sides of the card—we were able to crank clock speeds even higher. We finally topped out at a 530MHz core and 490MHz memory, very respectable numbers for a videocard at the top of its product class. (It's typically easier to get dramatic overclocks from parts in the middle or bottom of a product line.)

Our overclocked 5900 Ultra set Lab records in several tests. DM2003 cranked out the first overall *3DMark 2003* score we've seen above 7,000, and our *Splinter Cell* and *Unreal Tournament 2003* results were about 20 percent higher than the closest competition. **www.nvidia.com**

Soundcard: Creative Labs Sound Blaster Audigy 2

We're greatly impressed by the 24-bit audio fidelity of M-Audio's Revolution 7.1 soundcard. However, instead of using a

(continued on page 30)

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Sound Blaster Audigy 2

(continued from page 29)

dedicated (and expensive) DSP to handle processing chores, the M-Audio card relies on its host system's CPU for most computing-intensive audio tasks. This isn't a problem during music playback or sound editing, but when you're playing games, it can hurt to have your CPU worrying about audio chores as well. The CPU needs to pay keen attention to AI, physics, and random graphics chores, lest frame rates drop and a bad time is had by all.

So in the end, the M-Audio card was out of the running. Call us fuddy-duddies, but we still prefer soundcards with dedicated, onboard hardware acceleration. For now, the Audigy 2 continues to stand as the only consumer-level, 24-bit audio *accelerator* on the market, so it takes its rightful PCI slot position in Dream Machine 2003. **www.creativelabs.com**

CD-RW Drive: Plextor Premium

With a host of premium features such as a "silent" mode, the ability to jam 1GB of data onto a 700MB disc, and VariRec (which tweaks laser strength to improve audio disc compatibility in finicky boom boxes), the Plextor Premium gives us extras that are far more valuable than fast burning speeds. But that doesn't mean the Premium isn't fast. It burns CD-Rs at 52x and CD-RWs at 32x (good luck finding 32x CD-RW media!), and reads discs at 52x, making it the fastest all-around optical drive available.

We didn't hesitate in selecting the Plextor Premium for Dream Machine 2003, but we did hit a last-minute snag. Once our Voodoo cooling system was installed, there wasn't enough room for two optical drives with full-length casings—the Voodoo heat exchanger bumped up against the top-mounted drive. We knew we absolutely had to have the Pioneer DVR-A06 drive, so we were left to contemplate a Dream Machine minus the Sexy Plexy.

Acceptable? No way! So with safety goggles firmly affixed, our own Dr. Smith performed a Dremel job of epic proportions. We weren't sure the Plextor Premium would still work after Will hacked off part of its metal and plastic chassis, but nothing of importance was excised from the device. The drive loaded software, burned CDs, and extracted audio files flawlessly. **www.plextor.com**

DVD Burner: Pioneer DVR-A06

"There's something happening here. What it is ain't exactly clear. There's a man with a *format* over there. Telling us we got to beware. We think it's time to stop, children, what's that sound? Everybody look what's going down..."

We've seen enough studies and reports from both the DVD+RW/+R camp and its DVD-R/RW counterpart to be convinced that the recordable DVD standards war is screwed up beyond all hope. It is a Viet Nam quagmire being played out on polycarbonate. So we've given up on arguing the relative merits of either format and now just say, "Burn 'em all, and let God sort it out."

Which brings us to the Pioneer DVR-A06. This drive burns DVD-R, -RW, +RW, and +R, as well as CD-R and CD-RW. In short, it burns *every* DVD format, as well as the two CD formats (though its CD burning speeds aren't anything to get excited about). For more details on the Pioneer DVR-A06, see page 18. This drive is clearly the best dual-format DVD burner around. **www.pioneerelectronics.com**

Hard Drives: WD Raptors and Caviar SEs

When Western Digital released the first non-SCSI 10,000rpm drive a few months ago, we knew that we would eventually install at least one of these Serial ATA monsters in Dream Machine 2003. With 8MB of cache and benchmark scores obliterating the fastest 7200rpm competitors, the 360 Raptors are blindingly fast. The problem is that they hold just 36GB a piece, so even when we doubled their capacity via a RAID 0 array, we had just 72GB of storage space. That's not Dream Machine caliber, now is it?

The solution, of course, was to throw *two* RAID 0 arrays on our ABIT motherboard—the aforementioned Raptor drives complemented by two 250GB Western Digital Caviar SE drives (7200rpm, 8MB cache). The high-end Raptor drives run on the SATA RAID controller integrated into the Intel 875P chipset, while the Caviars hook into the Silicon Image RAID controller soldered onto our motherboard's PCB. All told, we stuffed some 572GB of data into this year's rig, and pretty much assured ourselves of never having to uninstall apps to make space *ever* again.

CRT Monitor: Sony F520

Want proof that the pace of CRT development is painfully slow? Please consider that we've chosen the Sony F520 as our dream CRT for *four* years in a row. This means that the best CRT available in September 2003 was *also* available in September 2000. Want to know what our dream videocard was in Sept 2000? A 64MB GeForce2 card!

The 21-inch, flat-screen Sony F520 is still the king of all CRTs because its

Sony F520

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The solution, of course, was to throw two RAID 0 arrays on our ABIT motherboard...

0.22mm grille-pitch spec has yet to be challenged by the NEC-Mitsubishi competition. The upshot is that the F520 offers the finest image detail around—high-res photos and games simply look better on the F520 than on any other monitor (and that's why the F520 is our reference monitor for image quality tests). Add in just about every CRT feature and onscreen control ever conceived by an R&D team, and you have the best monitor available.
www.sonystyle.com

LCD Monitor: Sharp LL-T2020B

OK, we know that very few people will spend $4,300 on an LCD display, especially for a system that already boasts extremely expensive components *and* a 21-inch CRT. But if price is no object, and you truly want it all, the LL-T2020B offers sublime liquid-crystal decadence, and makes the ultimate second monitor to plug into your videocard's DVI connector. The 20.1-inch diagonal screen size offers more screen real estate than the Sony F520, and Sharp's 10-bit gamma correction offers more visible colors and gray-tones than competing LCDs. Only high-end creative professionals really "need" the extra colors, but what the hell!

With a native 1600x1200 screen resolution, the LL-T2020B isn't the ideal candidate for a single-monitor system *(Maximum PC* is no fan of pixel interpolation). But we love the idea of outfitting DM2003 with a dual-monitor setup that costs far more than the aggregate hardware brought to many LAN parties!
www.sharp.com.sg

Speakers: Logitech Z-680

For the last several years, one version or another of the Klipsch ProMedia speakers has graced our Dream Machine parts list. This year, however, the Klipsch had serious competition from the Logitech Z-680s, and eventually lost out. The Z-680s meet the sound-quality bar set by the Klipsch speakers, but surpass the Klipsch system with the addition of a wireless remote control and decoder capable of processing Dolby Digital and DTS signals to supplement traditional analog inputs.
www.logitech.com

Keyboard & Mouse: KeyTronic Lifetime Series and Logitech MX700

This year, we went retro-chic and used a KeyTronic PS/2 keyboard. Long-time favorites of the *Maximum PC* staff, the ostensibly mundane KeyTronic keyboards have excellent tactile feel and have survived many a Subway sandwich and KFC crumbstorm. Logitech's MX700, meanwhile, is the first *wireless* mouse that's responsive enough for gaming. Sure, Thresh himself wouldn't use the MX700, because he's probably quicker than it. But this mouse is plenty responsive for the rest of us.
www.keytronic.com & www.logitech.com

Cables: Black Hole's Finest

Decadent build quality? In a computer cable? Aw, yeah! Nothing says "elite" like a collection of Black Holes. For Dream Machine 2003, we selected the BlackFlash Power Onyx (for power between the wall and DM2003 itself) and the BlackFlash Special Edition CAT 6 Ethernet cable (for all the LAN parties our editors will be attending). Both products look incredibly sexy when coiled up like snakes.
www.blackholecables.com

And so concludes our Dream Machine parts list. Let's see how the box performs, shall we?

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The Proof Is in the Benchmark Pudding

Good thing we sacrificed that goat to the gods of overclocking...

Wavy gravy: The Wave Master case from Cooler Master is just a tad bigger than the LANboy used in the Lean Machine, but much more solid.

Sugar free: The blue fluid in the Voodoo F-1 cooling system is a secret solution, but we can assure you that it doesn't taste like blue raspberry slushy at all.

Hack job: We needed to cut a nice chunk of metal out of the Plextor Premium CD-RW drive before we could get it to fit next to Voodoo's heat exchanger.

Cool 20K: The 10,000rpm Raptor hard drives behind this panel are kept cool by one fan blowing across the top and another blowing directly on the bottom.

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Another year, and another round of shattered benchmark records. We wouldn't have it any other way. We *couldn't* have it any other way. If a price-is-no-object Dream Machine can't knock the wind out of OEM competitors, it has no business standing on the podium.

All bluster aside, trying to extract unusual performance from this year's Dream Machine was exceedingly difficult, and we didn't embarrass the OEMs across-the-board. Last year, *Maximum PC* was lucky enough to score an exclusive videocard in the form of a fab-fresh ATI Radeon 9800 Pro, but this year, we had no such advantage. Intel, AMD, nVidia, and ATI all denied us early access to their next-generation silicon.

Our solution, of course, was to brazenly overclock current-generation parts (hand-picked for overclocking headroom, but current-gen nonetheless). Enter Voodoo's F-1 cooling system, which not only wicks away more heat than standard water coolers, but also takes up much less case space. (The F-1's footprint is so small, it fit entirely inside our darty, sports car–like Cooler Master enclosure.)

Once we fired up DM2003, we were pleased with our overclocking; the 3.2GHz Pentium 4C hummed along at 3.53GHz without a hitch. For this, we can give some credit to our ABIT IC7-G motherboard, which offered the BIOS settings that would let us lock down our AGP and PCI buses at 66MHz and 33MHz. Such lockdowns are important because PCI bus overclocking can bork Serial ATA controllers, and lead to undetected hard drives.

A 10 percent CPU overclock may not seem like much when other people are pushing liquid-nitrogen rigs to 4GHz, but we wanted DM2003 to run with all the reliability of a stock-clocked machine, and not for just the few minutes required to pull down some benchmark scores. Considering that 3.2GHz will likely be the fastest stock frequency for Intel's 0.13-micron CPUs (the company is moving to 0.09-micron this fall), we're satisfied with our completely stable 3.53GHz. It's not as if the current process technology has much more headroom.

Dream Machine 2003 posted a *SYSmark2002* score of 372—about 20 percent faster than the average 3.0GHz P4C, and roughly 13 percent faster than the 3.2GHz CyberPower machine reviewed this month. The dreamy one was also ahead of a 3.2GHz Velocity Micro machine, which itself had a pair of RAIDed Raptor drives, but only by an uncomfortable 6 percent.

In the CPU-dependent *MusicMatch*, our perfect 10 percent overclock resulted in a perfect 10 percent performance increase over 3.2GHz machines—and thus a Lab record was broken. The Plextor Premium CD-RW drive also did well with an audio extraction score of 150 seconds. This isn't a record breaker—we've seen other Plextor Premium units hit 140 seconds—but it's still supreme audio ripping.

As expected, DM2003 did not do well in *Premiere 6.0.* This video editing test heavily favors the Athlon XP architecture, as evidenced by the Lean Machine 2003's score on page 41. We suspect, however, that when Adobe releases the new version of *Premiere*, it will hook into the P4 architecture more favorably.

Our rig performed marvelously in PC gaming tests, as expected. In Game 4 of *3DMark2001 SE,* the overclocked GeForce FX 5900 Ultra cranked out 101.5fps, which puts DM2003 in a statistical dead heat with the Voodoo F-Class reviewed in July. Because both machines' videocards were clocked at nearly the same speeds, and because Game 4 is videocard-limited, it's no wonder both scores were the same. In *3DMark2001 SE's* overall score, DM2003 nailed a damned fast 19,260. We were touching 20,000 at more zealously overclocked GPU and CPU speeds, but the system stability we demand simply wasn't there.

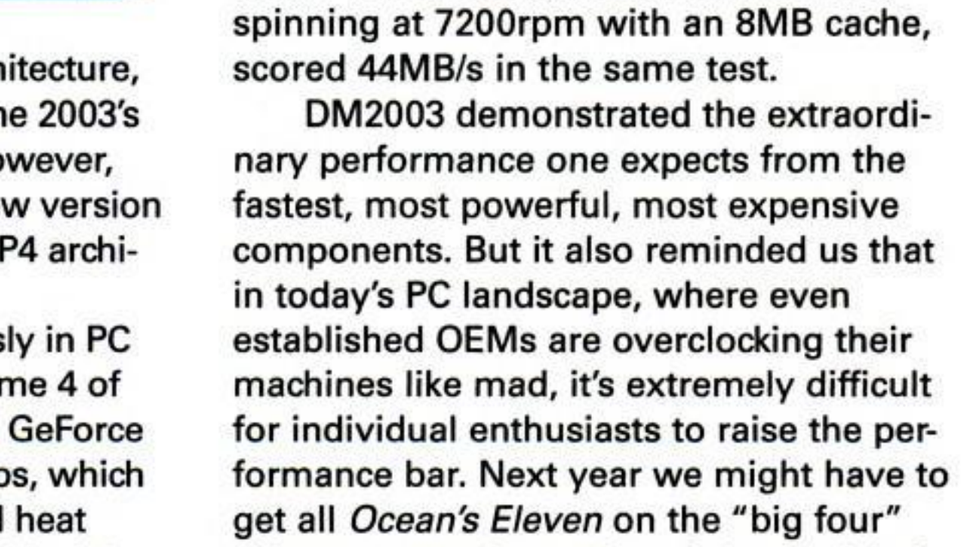
Just for funsies, we ran some other gaming benchmarks. Our custom *Quake III* demo at 1600x1200 hit 190fps. *UT2003* at 1600x1200 hit 181.5fps in the fly-by demo and 82.8fps in the botmatch. In the *3DMark2003* benchmark, we saw DM2003 break 7,000 in the overall score, while Game 2 hit 49.9fps, and Game 4 hit 41.9fps.

We couldn't resist running hard drive–specific tests on our RAIDed Raptors, and when we did, we saw average *HD Tach* read speeds above 65MB/s. To put this mega-performance in perspective, a single 120GB Seagate Barracuda drive, spinning at 7200rpm with an 8MB cache, scored 44MB/s in the same test.

DM2003 demonstrated the extraordinary performance one expects from the fastest, most powerful, most expensive components. But it also reminded us that in today's PC landscape, where even established OEMs are overclocking their machines like mad, it's extremely difficult for individual enthusiasts to raise the performance bar. Next year we might have to get all *Ocean's Eleven* on the "big four" silicon companies and outright *steal* their next-gen parts.

Our case window's logo was etched by a PC-controlled laser. You can do this too if you're willing to design your own logo, and throw down about $125 for the etching. Just confer with your local Plexiglas shop.

DM2003 demonstrated the extraordinary performance one expects from the fastest, most powerful, most expensive components.



Our zero-point system includes: an Intel D850MV motherboard, a 2GHz P4 CPU, 512MB PC800 RDRAM, a GeForce4 Ti 4600 videocard, and a Western Digital 1000BB hard drive (2MB cache).

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The Dream That Never Was

How would DM2003 be configured if we had a bit more time to collect parts?

Here's an early look at Athlon 64, front and back.

It happens every year: By the time all our hard drive platters have finally spooled down, we're left wondering what kind of Dream Machine we could have built if we'd had more time to collect parts.

That's the basic dilemma with any Dream Machine project. The rig we create is just a snapshot in time—a representation of the best PC configuration possible within a small window of opportunity. We present the Dream Machine to the public at large, and within weeks it becomes obsolete, thanks to the inevitable release of better components.

The problem is exacerbated by our publishing schedule. In order to make our printing deadlines, a Dream Machine is first conceptualized about three months before we go to press. And from a pure practical standpoint, all our last-minute, up-to-the-wire configuration decisions are completed about two weeks before our final press deadline. Benchmarking is finished about a week before that deadline. Long story, short, the machine described in the preceding pages was set in stone during the second week of July, 2003.

Now ask yourself, What day is it today? Are you reading this sometime in August? If so, faster PC components are probably already on store shelves!

Interested in what Dream Machine 2003 might have been? Here are some thoughts:

▶ AMD's Athlon 64 processor is on-deck for imminent release, and we wanted a taste of it for DM2003. Unfortunately, AMD wanted to keep the mysterious 64-bit CPU tightly under wraps until the end of September.

The intriguing thing about Athlon 64 is that it will process future 64-bit code as well as all the 32-bit code that currently runs under WinXP—and AMD tells us that the CPU's 32-bit abilities will be equal to or faster than the current-fastest Athlon XP performance. Athlon 64 should feature SSE2 support, x86-64 support, 1MB of L2 cache, and an integrated memory controller directly on-die. Considering that consumer-level software doesn't yet run in 64-bit, the integrated memory controller is Athlon 64's most interesting feature. This memory controller will operate at core CPU frequency, so if you have a 2GHz CPU, the memory controller will run at 2GHz as well, and not a paltry 400MHz.

Is Athlon 64 the stuff Dream Machines are made of? We'll have to wait at least a month to find out.

▶ Intel will also release its new CPU this fall—finally. Using a new 0.09-micron (90 nanometer) process, the CPU code-named Prescott could contain so many new features, Intel may decide to name it Pentium 5. While many of Prescott's features are still secret, Intel has disclosed that the proc will include some new instructions a la SSE and SSE2. There's been no confirmation, but many educated guessers believe that Prescott will also feature 1MB of L2 cache, and pack roughly 100 millions transistors.

Intel's M.O. has been to transition to a new process before making any serious core architecture redesigns. However, with all the hype circling around Athlon 64, we suspect Intel will try to pee on the AMD parade by packing in major architectural improvements in the new 90 nanometer process CPU.

▶ Of course, ATI and nVidia are continuing their Kirk versus Spock an-woon battle to the death. ATI is expected to soon release its R360 graphics processor, and this fall we might see an upgraded Radeon card that can apply the Vulcan death grip to nVidia's GeForce FX 5900 Ultra. nVidia, meanwhile, has been cagey about future updates, but we can assume that the nExecs are none too comfortable with the performance similarities of the 5900 Ultra and Radeon 9800 Pro 256 at stock speeds. If ATI releases R360 this fall, all bets are off.

Damn, it would've been nice to have one of these next-gen cards! We can only assume that the stakes are too high for both companies, and they didn't want to prematurely launch their next-gen silicon via our Dream Machine article solely for bragging rights. ■

And What of Last Year's Predictions?

Last year, we predicted that Dream Machine 2003 would be running a 4GHz CPU using a 90 nanometer process, and a frontside bus of 667MHz. Knowing what we did about Intel's 0.13-micron process, we didn't see much reliable performance above 3.5GHz. And true enough, the 3.2GHz P4 is the last of the 0.13-micron chips. Nonetheless, we still overshot last year's prediction by probably half a year of CPU development (and 800MHz).

This year, we want to be more conservative in our predictions for Dream Machine 2004—so let's just say we'll be looking at an Athlon 64 in the 3GHz range or a Pentium 5 at 4GHz. Sound fun? We'll also posit that DM2004 will run DDR-II memory or some other alternative RAM, and perhaps even a quad-channel RDRAM chipset.

Check back with us in 12 months.

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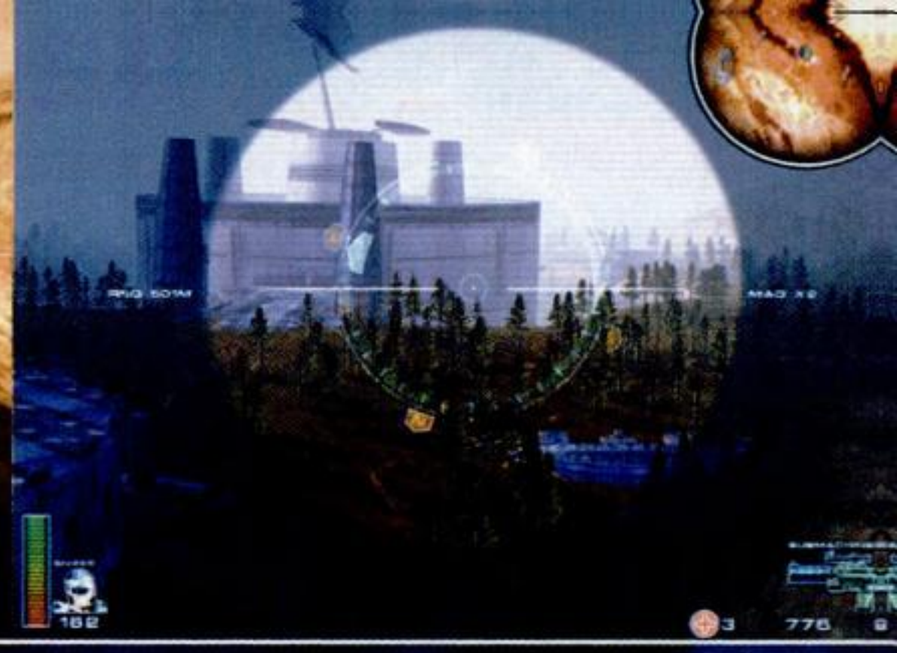

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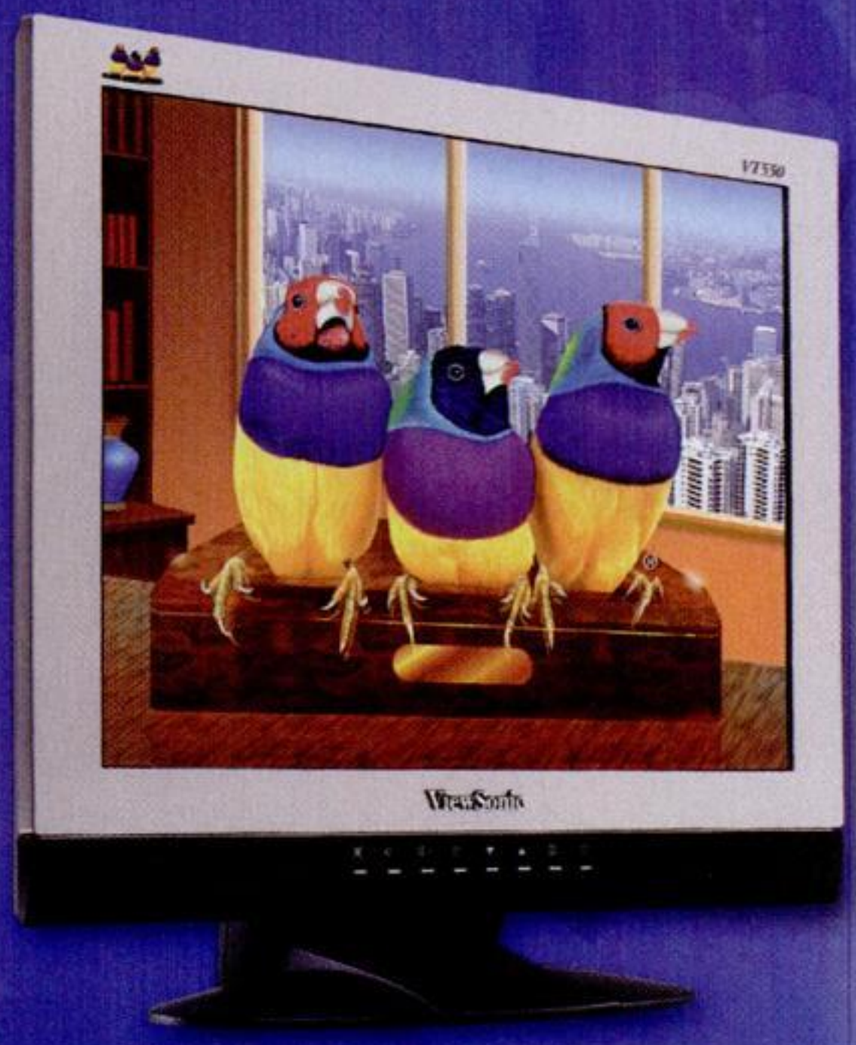

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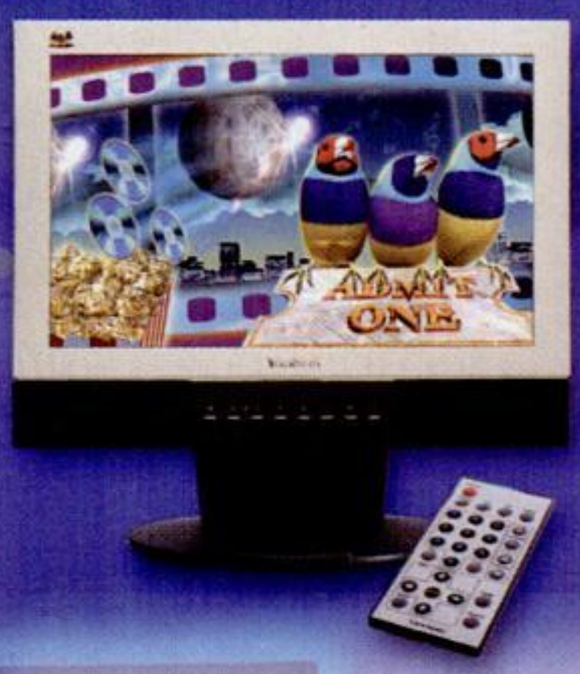
Now Every Room Can Have A View



Uptime, downtime. Work and play on the same wide screen LCD TV. ViewSonic has made the desktop far more than a simple workspace. Now it's a virtual visual playground on the N1700w wide-format 17" LCD with its own 181 channel TV tuner and remote control convenience. With additional connections for PC, DVD player, VCR, gaming console and digital cameras, your desk chair may be the best seat in the house!

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Expand your entertainment vision. Add TV to any monitor. Check out the complete line of advanced video processors from ViewSonic. They transform your display into a complete entertainment experience. Simple connections for high definition TV, DVD, VCRs, gaming consoles and digital cameras expand your desktop viewing capability for an amazingly low price. Use the remote to quickly switch between these options and your existing PC.

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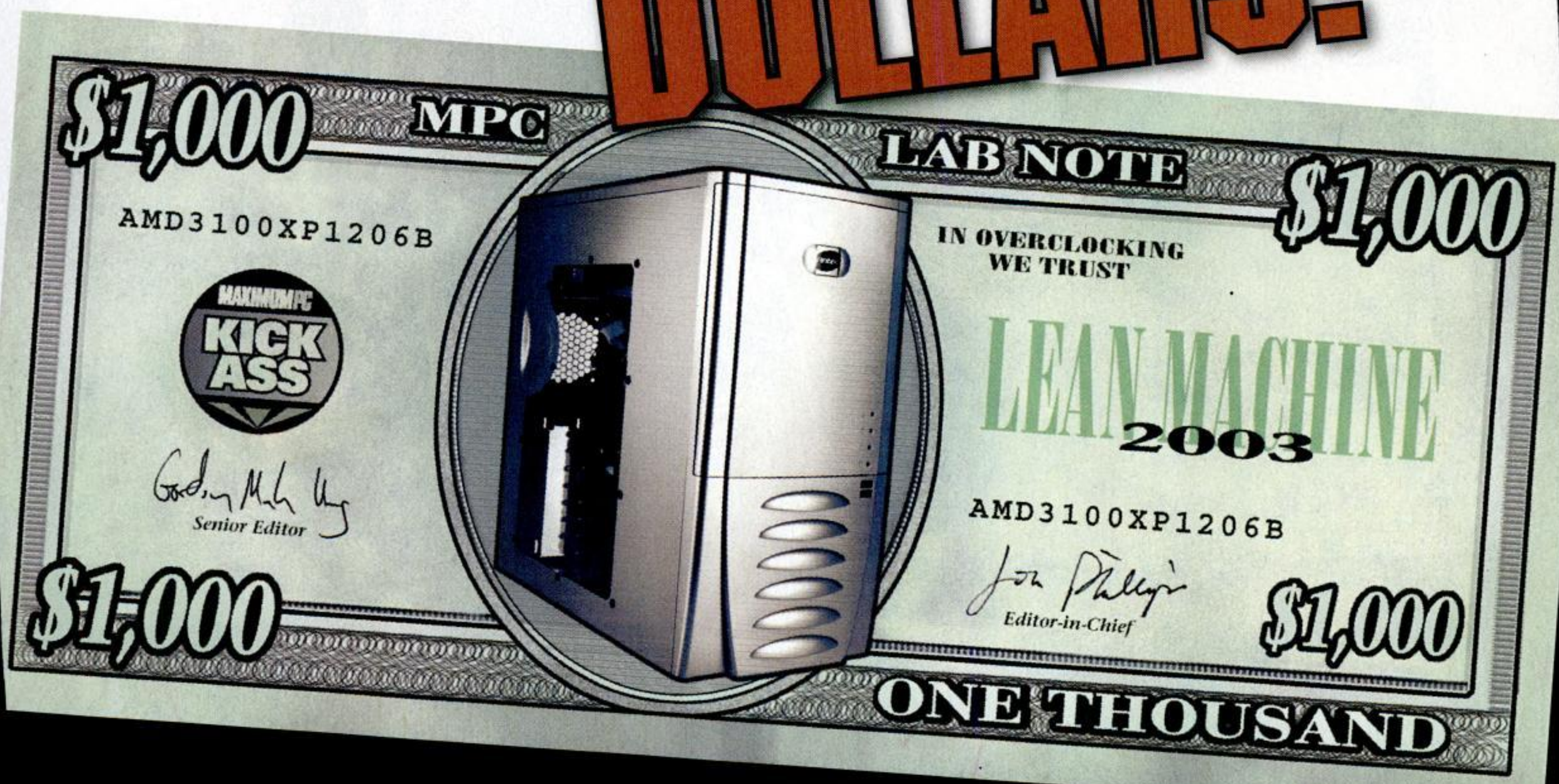
"We'd buy that for a THOUSAND DOLLARS!"



We proudly present Lean Machine 2003, the ultimate budget PC

Maximum power on a minimum budget. A $1,000 budget, to be precise. That's how much we spent on this year's Lean Machine creation. One thousand clams. Let that number ricochet around your cranium for a few seconds. That's 12 percent of what it cost to build Dream Machine 2003 (page 24)—and about 0.0006 percent of what it cost to make Terminator 3. Yet $1,000 is all that one really needs to build an honest, respectable, kick-ass PC.

Lean Machine 2003 will never chump Dream Machine 2003 in a benchmarking battle, and it doesn't possess any cutting-edge technology that's beyond the reach of everyday consumers. But our nondescript budget box does prove that with enough tenacity and finesse, anyone can configure a low-price rig that will handle all of today's computing chores with aplomb.

Yes, indeed. Lean Machine 2003 can run next-gen, DirectX 9 games like Half-Life 2 with all the glorious eye candy enabled. It'll also burn CDs and DVDs, and you can even use it to watch TV and record your favorite programs digitally.

So turn the page to see $1K worth of can-do silicon...

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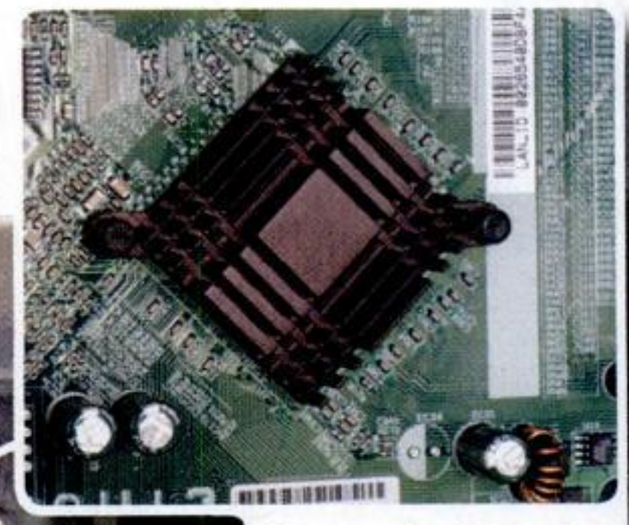
Lean MACHINE 2003



Even on a budget, you can afford dual-channel DDR care of the nForce2 chipset.

AMD's current bundled heatsinks are efficient coolers with thin and numerous cooling fins. Our specimen proved to be adequate, even for overclocking.

Just like the Hulk, the new ATI Radeon 9600 Pro is green and every bit as brawny in performance—especially when provoked into an overclocked frenzy.

The hard drive in last year's Lean Machine returns with 40MB more capacity and the same gargantuan cache.

The Antec Lanboy even comes with a carrying strap for party transport.

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The Guts: A Peek Inside LM2003

Just like last year's Lean Machine, this year's model is based on the Athlon XP CPU platform. Intel-based hardware might yield more raw performance, but AMD still offers the best value proposition.

▶ **CPU: Athlon XP 2500+.** The 2500+ is based on AMD's "Barton" core architecture, and is spec'd for a 1.833GHz core clock, a 333MHz system bus, and 512K of L2 cache. That's double the L2 found in earlier "Thoroughbred B" Athlons XPs. When on a tight budget, it typically pays to buy a CPU with a modern core, but stamped with a low speed rating. This often provides a CPU that yields extra overclocking headroom. And, indeed, ours did. We overclocked Lean Machine 2003 to a stable 2.145GHz! **$100, www.amd.com**

▶ **MOTHERBOARD: FIC AU13.** We just had to have a mobo with the nForce2 chipset and dual-channel DDR memory support (VIA's chipset and single-channel DDR are underperformers). This reasonably priced FIC mobo also includes onboard USB 2.0, FireWire, Ethernet, and 5.1 audio. Awesome! This means we won't have to buy a NIC or soundcard.
$79, www.fica.com

▶ **MEMORY: 512MB DDR333.** Two 256MB sticks of Crucial PC2700 CL2.5 memory let us take advantage of the nForce2's dual-channel memory bus, which demands two identically sized DIMMs in separate slots. These CL2.5 modules tend to tolerate frequency increases surprisingly well, despite their so-so CAS latency rating. They are also roughly two-thirds the price of CL2 modules, and this gave our budget a little breathing room.
$43 for each stick, www.crucial.com

▶ **VIDEOCARD: ATI Radeon 9600 Pro.** Featuring exactly half the number of pixel pipelines and vertex shaders of the Radeon 9500 Pro, the 9600 Pro may seem like a step backward. However, it compensates by running its core at 400MHz and memory at 600MHz (125MHz and 50MHz faster than the 9500 Pro, respectively). The 9600 Pro begs to be overclocked, and we are all too happy to oblige (see below for details). **$179, www.ati.com**

▶ **TV TUNER: ATI TV Wonder VE.** The Wonder VE can't match the TV recording functionality of TiVo, or even the ATI All-in-Wonder. But it does give LM2003 the ability to record and play back TV broadcasts.
$40, www.ati.com

▶ **HARD DRIVE: 120GB WD1200JB.** This fast and affordable Western Digital drive features an 8MB cache, giving LM2003 an elite, single-drive hard drive subsystem.
$119, www.wdc.com

▶ **OPTICAL DRIVE: Pacific Digital U-30182 DVD±R/CD-RW dual-format DVD and CD burner.** This sum-bitch consumed more than 20 percent of our budget, yet it's still the cheapest dual-format/combo optical drive that money can buy. It can handle any optical chore one can dream of, and because LM2003 is all about features, we couldn't resist splurging. It may not be best-of-class, but it's plenty good enough. **$219, www.pacificdigital.com**

▶ **CASE & OS:** The Antec Lanboy Aluminum is light, reasonably priced, and includes an adequate 350W (if not exactly "extreme") power supply. Toss in WinXP Home, and this machine is done.
$79, www.antec-inc.com; $99, www.microsoft.com

TOTAL PRICE: $1,000

THE GUSTO: OVERCLOCKED AND READY FOR ACTION

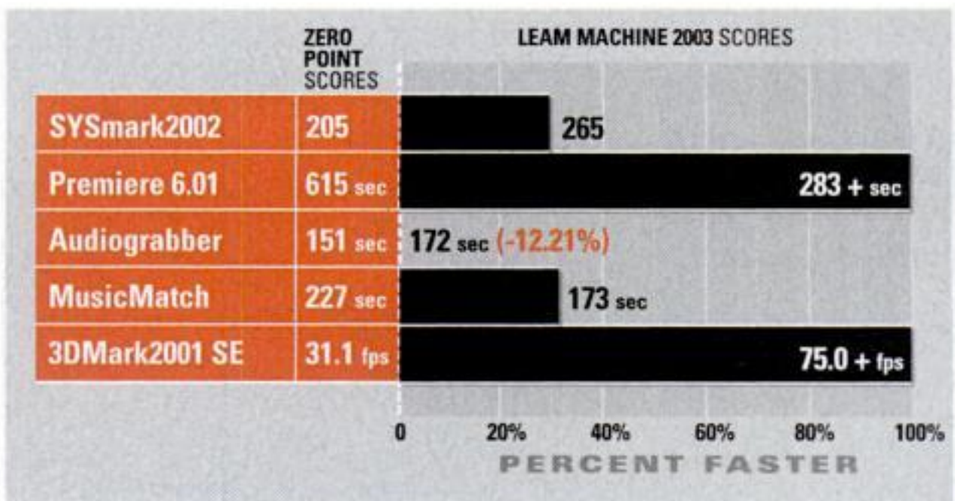
We knew our Barton-cored Athlon XP2500+ and Crucial 333MHz CL2.5 memory had untapped potential. But we didn't know exactly how much. It turns out we were able to push the CPU's bus from 166MHz to 195MHz, and still operate with unflappable stability. The push yielded a CPU clock speed of 2145MHz, which is practically Athlon XP 3000+ territory in core speed alone. On top of that, our 195MHz FSB speed is much closer to the 200MHz bus of the current-best 3200+ processor.

Clocked at 390MHz CL2.5, our Crucial DDR333 modules also chugged along smoothly. All in all, we'd say the frequency headroom potential of our parts was spectacular. Just consider: All dark artistry performed on LM2003 was done with AMD's bundled cooler, and we used no additional cooling gizmos on the CPU or memory!

As for our videocard overclocking, the 0.13 micron Radeon 9600 Pro managed to hit a 495MHz core and 680MHz DDR memory clock with nary a screen artifact or stability problem. We used Rage3D Tweak to overclock our Radeon 9600 Pro, but you can accomplish the same feat with another application such as Powerstrip.

THE GLORY: BENCHMARKS REVEALED

With our CPU, FSB, and videocard all running with wanton disregard for posted speed limits, our rig came within 26 percent of Dream Machine 2003's 3DMark 2001 score and within 29 percent of its SYSmark2002 score. And thanks to its Athlon XP processor, it even managed to edge past DM2003 in our Premiere benchmark despite a nearly 1.4GHz clock-speed deficit! This kind of performance should be more than enough zest for all but the most fervent PC fanatics. ■



Our zero-point system includes: an Intel D850MV motherboard, a 2GHz P4 CPU, 512MB PC800 RDRAM, a GeForce4 Ti 4600 videocard, and a Western Digital 1000BB hard drive (2MB cache).

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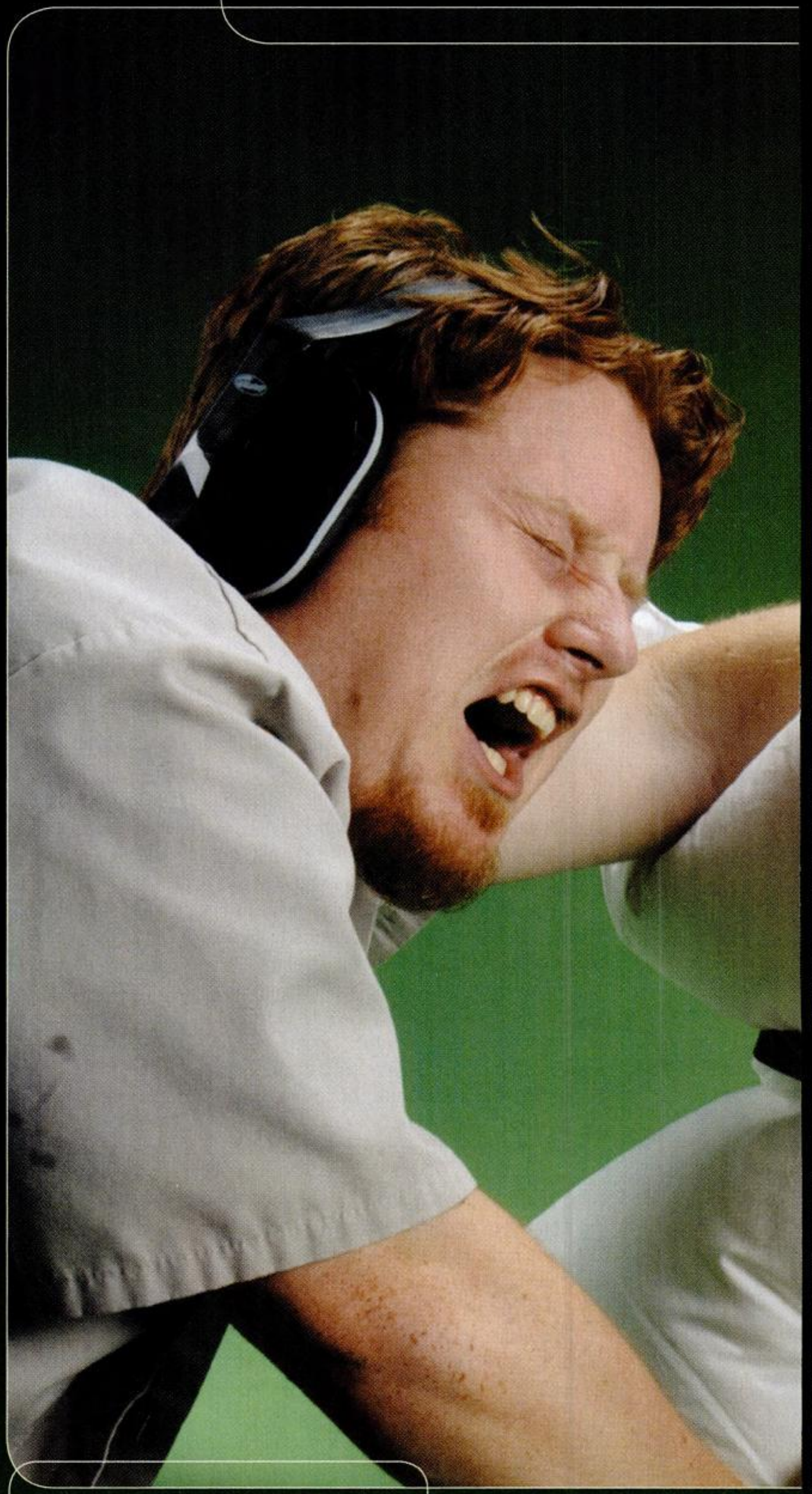
the silence of the fans

One transistor gives off a tiny amount of heat. Two transistors give off a little more heat. One hundred million transistors can fry an egg. One hundred million transistors—that's how many are packed into a single videocard GPU, and it takes some serious cooling to keep your electronics from melting down. That's why proper cooling for your PC requires as much thought and careful planning as picking the right components. Long gone are the days when a motherboard might sport a single, sad-looking heatsink propped atop the CPU. Today, many PCs sport five, six, and even more fans blowing on different components. Consequently, noise management has become an official issue.

Must we all resign ourselves to living in a room full of turbo props? No. With the right components and the right approach, you can have power and tranquility. But before you attack your noise problems, you need to know what you're up against. That's where we come in. In preparation for this article, we spent countless hours analyzing sources of noise, testing the latest and greatest in quiet cooling products, and perfecting strategies to silence a PC without baking its components like a batch of Tollhouse cookies.

Quieting your system isn't something that can be done by changing a solitary part or adding a simple doodad, but it's not all that difficult either. Read on, and we'll tell you everything you need to know about putting a sock in your PC's mouth.



by omeed chandra

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High-performance components demand high-performance fans—and high-performance fans can create one hell of a racket. Sick and tired of hackneyed soundproofing solutions? Here's everything you need to know about properly quieting your PC.

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Groan Zones

Zooming in on your PC's noisiest offenders

Power supply fan: These days, it's not uncommon for power users to stock their PCs with power supplies rated at 400 watts and higher. All this juice generates a considerable amount of heat, making active cooling a necessity for virtually every modern power supply. And as we all know, fans are good for two things: cooling and making noise.

Optical drives: Today's fastest optical drives rotate discs at around 10,000rpm. That's thousands of revolutions faster than most hard drives and even most automobile engines. It's no wonder that burning a CD at 52x can sound like a jet plane taking off. Some optical drives even include internal cooling fans.

Case fans: All the heat radiated by the components in your PC has to be whisked away somehow, and that's where case fans come in. The more heat your components radiate, the more air your case fans need to shuffle in order to keep the inside of your PC cool. And the more air your fans move, the more noise is generated.

CPU fan: Once upon a time, CPU speed was measured in megahertz, and cooling was a nonissue. Fast forward to 2003: The 3GHz mark has been breached, and modern CPUs are pumping out heat like crazy. There are many approaches to cooling a CPU, but the cheapest and most practical is a high-speed fan—and that means noise, noise, noise.

Chipset fan: With built-in sound, LAN, USB 2.0, FireWire, and even 3D graphics, today's motherboard chipsets are doing double and triple duty. As a result, they generate more heat, so many motherboards now ship with fans installed on the northbridge chip.

Hard drives: Some hard drive noise comes from the internal metallic platters that spin thousands of times every minute. But the loudest and most distinguishable noise comes from the flicking of the drive heads that actually read the data stored on the platters. And, of course, many PCs have extra fans aimed at hard drive arrays.

Videocard fan: The latest videocards require powerful active cooling to keep their GPU temps under control. Active cooling entails a fan/heatsink combo or some other type of cooling system that relies on moving parts. (Passive cooling relies on heatsinks alone to dissapate heat.) While not all videocards are as ridiculously loud as the blustery GeForce FX 5800 Ultra, any videocard with a fan will contribute to your PC's overall noise level.

Case: A poorly-built case can amplify, rather than absorb, the sound generated by your PC's components, making your system seem louder than it actually is. Cases crafted from lightweight metals—such as aluminum—tend to be more prone to this effect.

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Choosing Your Soundproofing Approach

Foam, water, or cash. It's your call

There are three major approaches to quieting a PC: water cooling, component replacement, and soundproofing. Each has its inherent advantages and disadvantages, and in the end, you'll probably find that the ideal strategy involves a combination of two or even all three of these methods. Here's a brief breakdown of your options.

WATER COOLING

The most extreme approach to quiet cooling also happens to be the most effective. Water cooling starts with metal "heat blocks" that are attached to the hottest components in your system (such as your CPU, video chip, and hard drives). Each block attaches to a component on one side, and plastic tubing on the other side. The tubing runs to a central radiator. Cool water is pumped from the radiator, through the tubes, and to the heat blocks, where it absorbs the heat generated by your components. The water, now a bit warmer, heads back to the radiator, where the heat is dissipated—and thus the cycle begins anew. This system eliminates the need for cooling fans, and the apparatus itself runs relatively quietly.

But water cooling isn't for everyone. It can be expensive (in excess of $300) and difficult to install, and if your water cooler breaks and leaks water all over your hardware, you're hosed—literally and figuratively. If these caveats don't make you nervous, consider that water cooling makes a system run significantly cooler than conventional cooling, while simultaneously cutting noise. Should you decide to take the plunge, look for a water-cooling kit that is well-constructed and uses a quiet water pump. Our favorite is the setup built into the Chip-Con Prometeia tower (**www.prometeia.com**), but at $700, it's an investment, to say the least. A more modest solution would be Innovatek's InnvoaSET3 ($325, **highspeedpc.com**).

⊕ **PROS:** Very effective and quiet cooling.
⊖ **CONS:** Pricey. If it breaks, you can kiss your PC goodbye.

COMPONENT REPLACEMENT

Replacing noisy components in your system with quieter ones is an effective approach, because you're essentially attacking the problem at the source. On the flipside, given the long list of noise-generating parts in your PC, component replacement can get expensive. What's more, the quietest PC parts are often not the highest-performing, so you may be shaving off some benchmark points along with decibels.

The good news is that you have options. A number of companies make quiet CPU coolers, case fans, and power supplies; we've reviewed some of them on the next few pages. Many hard drives now use fluid bearing motors for reduced noise. Maxtor's DiamondMax Plus 9 (starts at $120, **www.maxtor.com**) is exceptionally quiet and offers Lab-approved performance, while Seagate's Barracuda V (starts at $150, **www.seagate.com**) is also reasonably quiet.

If you don't need bleeding-edge 3D performance, you can also have a silent videocard. End PC Noise (**www.endpcnoise.com**) offers an MSI GeForce4 Ti 4200 card (reviewed on page 46) with a heat pipe in lieu of a fan, and Sapphire ($141, **www.sapphiretech.com**) offers Radeon 9600 cards that run with just a heatsink. Do-it-yourselfers can install an aftermarket cooler on their existing videocards. The Vantec Iceberq 4 ($20, **www.vantec.com.tw**) is a copper heatsink/fan, while the Zalman ZM80A-HP heat pipe ($35, **www.zalmanusa.com**) offers fanless cooling; both support up to Radeon 9800 and GeForce4 series videocards.

Optical drives are notoriously screechy. But aside from the extremely quiet tray eject and load mechanism built into Plextor PlexWriters, the quietest all-around optical drive is Samsung's SM-332 combo 32x CD-RW and DVD-ROM.

⊕ **PROS:** Effective, since it cuts off noise at the source.
⊖ **CONS:** You may sacrifice performance, and replacing lots of comnents gets expensive.

SOUNDPROOFING

This approach involves placing sound-deadening materials and insulation inside your case to absorb the noise generated by your fans and other moving parts. It's somewhat effective and not too expensive (around $50 to $100), but if applied willy-nilly, soundproofing can lead to dangerous temperature increases. Dynamat (**www.dynamat.com**), Magic Fleece (**www.frozencpu.com**), and AcoustiPak (**www.quietpc.com**) are all popular noise-and vibration-absorbing pads. We prefer Dynamat, which does a decent job of absorbing noise while increasing case temperatures only slightly. Magic Fleece cuts more noise, but significantly increases case temperatures, thus defeating your original cooling goals. AcoustiPak reeks of dead fish. No, we're not kidding.

If your hard drive is annoyingly loud, check out the Smart Drive 2002 (**www.endpcnoise.com**). This enclosure for your hard drive noticeably reduces noise, and its manufacturer says it can safely be used with any 7200rpm drive and even some 10,000rpm drives.

What makes sound-deadening materials designed for your PC different from ordinary padding and acoustic materials, besides being just a couple millimeters thick, is that they reduce the resonance of your PC's case that amplifies the noise of all the internal fans.

⊕ **PROS:** Reasonably effective; fairly inexpensive.
⊖ **CONS:** Can dangerously increase case temperature if you're not careful.

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Replacement Killers

(Noise killers, that is)

One way or another, these components promise to smite noise pollution. But which ones are worth the price of upgrading?

Using water cooling to quiet a PC is a rather drastic step, so most people will install either generalized soundproofing materials (discussed on page 49) or replacement parts that run without clamor. In this section, we review a number of replacement parts that were specifically designed to address the racket caused by modern, high-performance computing.

When we began testing these products, we used decibelometers to determine relative noise output, but this strategy proved unreliable (the Maximum PC Lab isn't sound-free, after all). So in the end, we decided to use our own ears to subjectively analyze each component's noise output. For the reviews in this article, our verdicts are primarily based on a component's noise output. In other words, the Antec Sonata might be the quietest case you'll ever find, but it might not be the absolute best case across-the-board.

Antec Sonata

Though it bears a striking resemblance to the Antec Lanboy, the Sonata is sturdier and lacks the Lanboy's side-panel window.

Drive rails are included, as are front-panel FireWire, USB, and audio ports. But all these features are standard fare. With product packaging that reads "Hear the silence!," the Sonata is most noteworthy for its noise-reduction features. The included 380-watt power supply monitors case temperatures and automatically lowers the speed of up to five fans when appropriate (the PSU comes with two internal fans, and three case fans can be hooked up to the PSU's special power connectors). This ensures that your fans never run any faster—and thus generate more noise—than necessary.

While most cases ship with 80mm fans, the Sonata comes with a 120mm rear exhaust fan that moves as much air as a smaller fan would without running as quickly (or as loudly). Other nice touches include rubber grommets that absorb hard drive vibrations, and a drive cage that faces the side of the case instead of the back (making it easier to tidy your cables for improved airflow). Overall, the Sonata won't grant complete silence, but it can get you closer to it.

Verdict: 9, $129, www.antec-inc.com

Zalman CNPS7000-Cu

The "blooming flower" Zalman adds a degree of visual splendor to any system, and it's not a matter of style over substance: The speed-adjustable CNPS7000-Cu cooler will be a boon to anyone trying to shush a P4 or Athlon 64 system. Yeah, you heard us right. This heatsink/fan combo supports AMD's soon-to-be-released 64-bit desktop processor.

The CNPS7000-Cu installs without trouble and locks firmly in place with two screws. For testing, we fired up CPU Burn-In to generate as much processor heat as possible, and then compared the Zalman (set at its "normal" speed setting) with the stock Intel P4 cooler. Both coolers ran within one degree of each other, and the Zalman produced slightly less noise than our stock cooler. Running in its silent mode, the Zalman was even quieter still (though not actually silent), but while its cooling abilities were fine for regular workloads, we would never run an overclocked CPU with a throttled down Zalman. If you have a stock Intel heatsink/fan for your P4, there's no real reason to upgrade to the CNPS7000-Cu. But if you're stuck with a loud cooler and desire quiet yet effective cooling, Zalman has just what you need.

Verdict: 9, $45, www.zalmanusa.com

Enermax UC-A07FATR2

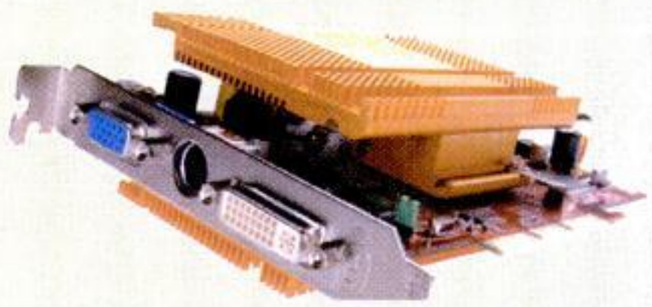
We were smitten the moment we laid eyes on this fan-speed controller. Two fans can be hooked up to the UC-blah-blah (sorry, Enermax, but your product names are even more ridiculously unwieldy than Zalman's), and their speeds can be easily adjusted via two front-panel knobs. Sure, most fan-speed controllers sport speed adjustments for at least four fans, but the Enermax makes up for this with a bevy of handy I/O ports. You'll find FireWire, USB, and audio connectors that hook up to the ports on the back of your PC via pass-through cables.

This Enermax also includes two temperature sensors that can be placed anywhere in your system. Temp readouts and fan speeds are displayed on a backlit LCD. You can set minimum speeds for each fan, and maximum temperatures for each sensor. If these thresholds are breached (indicating possible fan failure or overheating), the panel emits an audible alarm. This brings us to this product's two flaws: Switching between Celsius and Fahrenheit temperature modes requires a jumper change, and our custom fan speed and temperature threshold settings were lost every time we turned off our test system.

Verdict: 8, $37, www.enermax.comtw

End PC Noise MSI GeForce4 Ti 4200 128MB

What could possibly make us award a 7 verdict to a Ti 4200? In a word: silence. Most fanless videocards are poor 3D performers, but this modified MSI board serves up programmable shaders and enough horsepower for most of today's games. The magic is made possible by the Zalman ZM80A-HP copper heat-pipe system. Anyone can purchase and install this



fanless system, but this high-quality offering from End PC Noise takes care of all the dirty work.

Truly silent operation aside, performance was on par with other GeForce4 Ti 4200 boards—meaning the card will buckle under the demands of Half-Life 2 and Doom3. Also, the bulky Zalman heat pipe on this AGP 8x card will block a PCI slot. But otherwise, this is a nice solution for anyone trying to balance quietness and 3D performance.

Verdict: 7, $180, www.endpcnoise.com

Enermax UC-12FAB 120mm

This hulking 120mm fan from Enermax continues the company's tradition of memorable product names. The UC-12FAB's rotation speed is user-adjustable from a low of 1500rpm to a high of 2300rpm. The noise level ranges from minimal at lower

continued on page 48

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From Ensemble Studios,
the creators of Age of Empires.®

AGE of MYTHOLOGY® the TITANS EXPANSION

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Replacement Killers

(Noise killers, that is)

continued from page 46

speeds to quite loud at maximum speed. The fan is efficient, moving as much as 95 cubic feet of air per minute (according to product specs). Our principal complaint is that speed adjustments require a screwdriver rather than the simple twist of a knob. What a stupid design decision!

Verdict: 8, $20, www.enermax.com.tw

Vantec ThermoFlow 80mm

This fan monitors your case temperature and automatically adjusts its rotation speed accordingly. Its speed ranges from 1950rpm to 3400rpm, and at maximum speed, it moves a reported 41.6 cubic feet of air per minute, which is indeed respectable for an 80mm fan. The ThermoFlow is quiet at its lowest speed setting; almost as quiet as the Silencer reviewed below. However, pushed to the max, this fan gets pretty loud.

Verdict: 9, $10, www.vantec.com.tw

PC Power and Cooling Silencer 80mm

The Silencer is a traditional fan if ever there was one. Available in both three-pin and four-pin Molex power connector varieties, this 80mm jobbie lacks fancy features such as temperature monitoring or adjustable fan speed. It also moves just 27 cubic feet of air per minute, paling in comparison with the Enermax and Vantec fans. But, when it comes to peace and quiet, the Silencer offers more of it than the Enermax and Vantec fans. You know your cooling requirements, bud. It's your call.

Verdict: 8, $8, www.pcpowercooling.com

GUP Smart Drive 2002

Hard drives have become quieter in recent years, thanks to fluid dynamic bearing motors, which emit less noise than ball-bearing motors. But not everyone wants to buy a new hard drive just to get a marginally quieter computing experience. And for some people, even the quietest hard drive may not be quiet enough. Enter the Smart Drive 2002, a product that purports to cut hard drive noise without significantly increasing operating temperatures.

Installation entails putting your hard drive inside the Smart Drive enclosure, then sealing it shut with six screws. This design can be a hassle if you ever need to access the back panel of your hard drive (to change jumper settings, for example). Once sealed, the Smart Drive fits into a 5.25-inch drive bay. The device claims support for all 7200rpm drives, and even some 10,000rpm drives. We tested it with several 7200rpm models and measured only minor increases in temperature when the drives were inside the enclosure. On the noise front, the Smart Drive noticeably hushed all the drives tested. A screeching IBM Deskstar became almost as quiet as the stealthy Maxtor DiamondMax Plus 9, while said Maxtor became nearly inaudible. All in all, the Smart Drive 2002 is a great noise-pollution solution, though it is a tad expensive.

Verdict: 9, $70, www.endpcnoise.com

PC Power and Cooling Silencer

PC Power and Cooling is synonymous with high-quality power supplies, and true to form, this 400-watt PSU doesn't cut any corners. Its performance and longevity will leave you confident your power situation is stable, and this particular model sports Serial ATA adapters and sleeved wires. However, the overriding factor in this roundup is noise, or rather the lack thereof, and in this department, the Silencer falls short.

It's a bit quieter than our baseline power supply (an old 400-watt Antec unit), but far louder than other PSUs tested this month.

Verdict: 7, $170, www.pcpowercooling.com

Nexus NX-4000

Straight from the wild-and-woolly Netherlands comes the 400-watt NX-4000, a generic-looking power supply indeed. Beneath its humble exterior, however, the Nexus is a well-built PSU with a solid, sturdy feel to it. (Heft and heaviness, believe it or not, are generally reliable markers of a good power supply. The bad PSUs are almost always as chintzy as they feel.) More importantly, though, the Nexus was noticeably quieter than the other contenders in this group—virtually silent, especially compared with our baseline PSU.

Verdict: 9, $105, www.nexustek.nl

Enermax EG465P-VE FCA

Enermax's cryptically named PSU sports the highest-rated output of the bunch (460 watts), as well as a user-adjustable fan-speed setting. The latter is a feature we're normally wary of in power supplies, but the EG465P-VE FCA includes anti-overheating circuitry. The unit feels fairly solid, albeit a bit lighter and less well-built than its competition. Noise-wise, the Enermax is quieter than the PC Power and Cooling unit, but falls short of the standards set by the Nexus and Vantec products.

Verdict: 7, $90, www.enermax.com.tw

Vantec Ion

Vantec is a newcomer to the power supply market, but you'd never guess it from the quality of the Ion. This 400-watt unit is well constructed and comes complete with Serial-ATA adapters. The Ion sports temperature-controlled fans, and under normal usage it was one of the quietest in this group, falling short of only the near-silent Nexus.

Verdict: 9, $60, www.vantec.com.tw

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Hands-On Soundproofing

How to stuff your PC with Dynamat—the right way

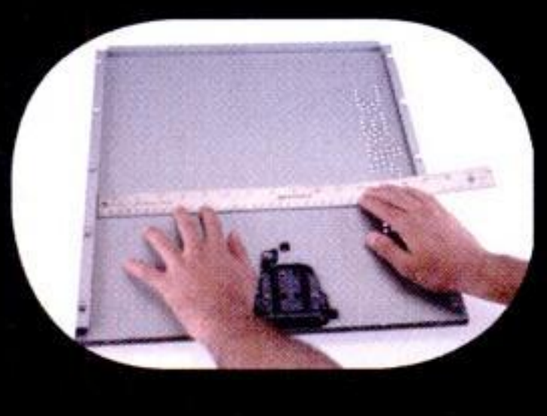
If you want to reduce the noise coming from your PC, you could stuff it full of foam. Technically, it would work, because foam is an acoustic absorber that "traps" noise. But you'd need a lot of it, it would eventually catch fire, and then you'd really have a silent PC.

Noise-deadening material such as Dynamat (www.dynamat.com) doesn't bother with acoustic absorption. Instead, it goes straight to the source of the problem. All those internal fans cause the metal of your case to resonate, which amplifies the commotion they make. Dynamat's material—the composition of which we dare not disclose for fear of having to spend the rest of our lives watching our backs—prevents your case from resonating by converting the noise vibrations into very low-grade heat. Don't panic, though, the thermal energy that's produced is slight as long as you don't overdo it. Applying too much of the 2mm-thick Dynamat will certainly raise case temps, so here's our guide to the proper application of noise-reducing material.

WHAT YOU'LL NEED:

- ❑ Scissors
- ❑ Scotch tape
- ❑ Noise-deadening material, such as Dynamat

STEP 1 TAILOR THE MATERIAL TO YOUR CASE



At the very least, you'll want to apply noise-deadening material to the side panels of your case. Depending on the particular brand of material you buy, you may want to apply it to the top and bottom of the inside of your case as well. We chose Dynamat for its minimal impact on case temperatures (Magic Fleece raises interior temps too high for our liking), and the fact that it doesn't smell (unlike the reeking AcoustiPak).

Measure the interior of your case where you'll be applying the material (you'll need to cut your sound-absorbing pads into the appropriate shapes and sizes to fit your particular case). The amount of material necessary will vary depending on the size of your case (a bigger case merits more material), as well as the brand of material. For instance, Dynamat recommends just a few strips for your entire case. Remember, you're making a trade-off between reduced noise and higher internal temperatures. Whatever noise-deadening material you buy should come with specific guidelines on how much to apply.

STEP 2 DO A TEST RUN BEFORE THE FINAL APPLICATION

Applying noise-deadening material to your PC is pretty much an irreversible decision. Once it's stuck onto your case, removing it is a real pain in the arse. So, before you remove the adhesive cover from the pads, do a test run to make sure you're not unduly increasing the operating temperature of your system. Temporarily install the noise-deadening material using Scotch tape and monitor your PC's temperatures while running some intense apps (see sidebar). Make any necessary adjustments to the amount and positioning of the noise-deadening material. Note that you may not notice much reduction in noise while the noise-deadening material is merely taped to your rig.

STEP 3 ADHERE THE MATERIAL TO YOUR CASE

Once you strike an acceptable balance between noise and temperature, peel off the adhesive cover and install the noise-deadening material permanently. Be careful! You don't want to mess up the installation, because there's no handy "Undo" button to rescue you if you're jittery. After you're done, close up your case and enjoy the peace and quiet.

DON'T LET YOUR PC SWEAT IT!

While we've found that Dynamat causes only negligible temperature increases when applied properly, other sound-absorbing products tend to have a bigger impact. Before finalizing your installation of noise-deadening material, we strongly recommend doing a test run to monitor initial temperature increases. Even after final installation, we suggest you closely monitor your CPU and case temperatures for a few hours to make sure everything is in working order. Motherboard Monitor (mbm.livewiredev.com) is a good free utility that will allow you to do this from within Windows. If you find your temperatures getting too high, you may want to use less noise-deadening material, or at least reposition it to be farther from hot-running components. Remember, unduly high temperatures can endanger your components or compromise your PC's reliability—a steep price to pay for a quieter computing experience. ■

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Ask the Doctor

Symptom ▶ Diagnosis ▶ Cure

A DELL DILEMMA

I'd like to pull my Dell Dimension 8100 from its case and put it into something newer and a little more exciting. There are two parts I'm worried about: the Dell mobo and power supply. Can I transfer these Dell parts over to a new case?

—HAROLD HENN

You can probably transfer your system to a standard ATX case, but the only way to know for sure is to try. If the ATX backplane connector on your mobo is physically compatible with your new case, it will most likely work. However, if your mobo won't fit into the case, you'll have to procure a new power supply and motherboard.

AVOIDING THE XP CD PROMPT

I'm trying to set up Windows XP so it doesn't ask me for the CD whenever I add additional components. In the June 2000 article "Windows 98 Clean Start," you described a technique to copy certain files from the CD to the hard drive and run setup from there. This worked great for me, and I looked for a similar method in the August 2002 "WinXP Clean Start" article, but there was none.

I've tried to use the "Advanced Options" > "Copy all installation files to hard drive" option during XP install, but it looks like all the files are deleted during the clean-up part after the install.

I've tried copying the i386 directory from the CD to a local directory named C:\WINXP\I386 and messing with the Registry to change HKEY_LOCAL_MACHINE\Software\Microsoft\Windows\CurrentVersion\Setup\SourcePath to point to C:\WINXP, and this seems to work for installing some additional Windows components.

Is there a better way than hacking the Registry? The "Windows 98 Clean Start" technique avoided the Registry hack. Is there an WinXP equivalent?

—PAUL ASKOUNIS

We don't know of an easier way to get your WinXP installation files onto your hard drive. We'd gladly sacrifice a few hundred megabytes of space on our drive to never need the original install CD. Like you said, checking the box to copy files to the hard drive during setup doesn't store them permanently on the drive; it just copies them there to speed the install process and deletes them when it's done.

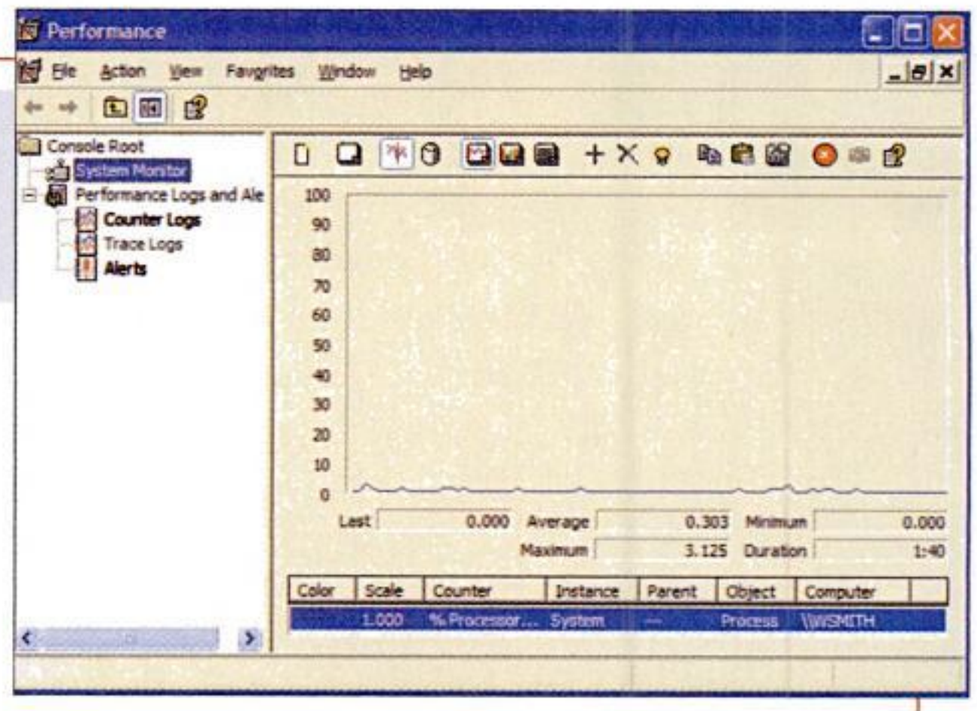
PERENNIAL PERFORMANCE PROBLEMS

I've had WinXP since the first month it was out, and I've noticed a sporadic problem. My PC slows down to the point of crawling at times. When I check the Task Manager, I notice that the "system" process is running at 100 percent. A reboot stops the slowdown, but it inevitably comes back.

What puzzles me the most is that I've had this problem consistently over the last two years spanning three motherboards, four processors, and 20 fresh reinstalls of WinXP. All of my hardware (including floppies) has been changed out during the course of my upgrades, so it can't be a hardware problem. I'm a stickler for trying to keep current, so all the hardware is flashed to the newest versions, and all my drivers are the latest builds.

Please help!

—MICHAEL FORKASH



The Performance tool is your best bet for isolating misbehaving applications. You can easily isolate the CPU usage for a single process and track it over time.

We've seen this before and it's usually the fault of either a badly written driver or an especially unpleasant virus. Another suspect is spyware running distributed computing—similar to Seti@Home—in the background and disguising that CPU usage as a System process. We've also heard reports of a bug in Windows XP Service Pack 1 having the same effect.

Because you've updated all your hardware, it's likely either a virus or spyware that's causing your problem. Get a virus scanner, such as *McAfee VirusScan* or *Norton Antivirus*, update your definitions, and do a full system scan. If that doesn't turn up anything, start with a clean install of Windows XP, then add one piece of software at a time to your system. First test the system with no other software installed. Then install Service Pack 1 and test again. Finally, install the other software you use, one item at a time, and test them individually. If you're still experiencing problems, disconnect your PC from the network and see if that fixes the problem.

When conducting your tests, the Performance applet comes in handy. It's located in Start > Control Panel > Administrative Tools > Performance. Open up the Performance Logs section, then click Counter Logs. In the right pane, right-click and select New Log Settings. Give your log a name, and then click the Add Counters button. Change the Performance object to Process and select the % Processor Time counter from the counter list, and then choose the System process from the list of different processes. The Performance tool will record the CPU usage for the particular process you're troubleshooting while you run your tests. To see if it spiked while you were testing, open the Performance applet again and press Ctrl+L to open a log file. If you click the Add button and select the log you've created, it will show you a graph of the CPU usage for the process you selected.

Make sure you disable any counter logs you create when you're done with them, as some can seriously degrade your PC's performance.

OVERHEATERS ANONYMOUS

I recently purchased *Unreal II* and was happily playing along when my computer went black and rebooted. The spontaneous reboots only seem to happen when the graphics load is really high. I'm running an Athlon 2400 XP chip on an Asus A7V266-E mobo with 512MB DDR RAM. My videocard is an nVidia GeForce3. I'm not overclocking anything!

—DANIEL BOWEN

Spontaneous reboots are almost always caused by an overheating component, although they can also be a symptom of bad drivers. Update your videocard and chipset drivers to the latest versions before you do anything else. Get chipset drivers from your mobo's manufacturer, and the

continued on page 52

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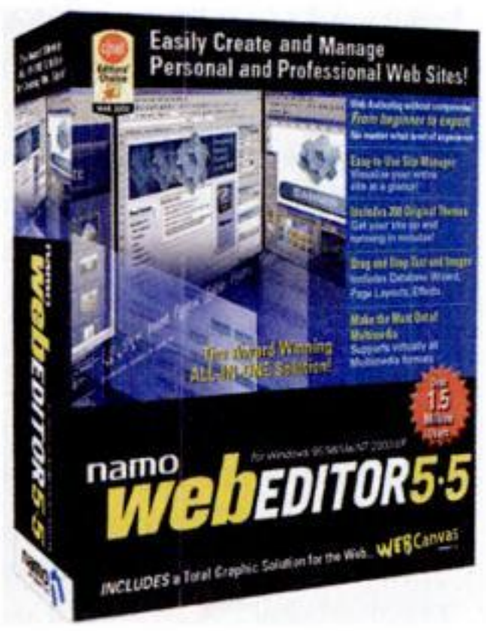

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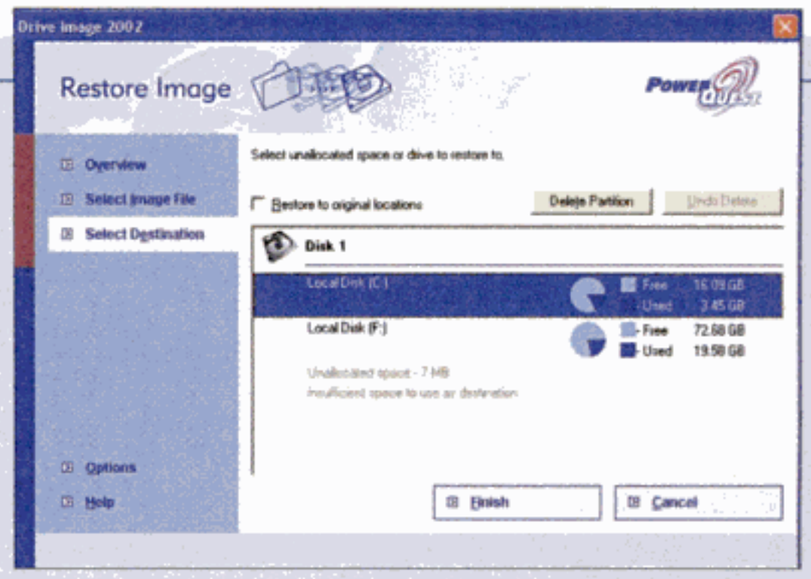
videocard driver from your 3D chipset's manufacturer, usually nVidia or ATI.

Check the fans on your CPU and videocard to make sure they're functioning. If they're both in working order, you might have a problem with the general airflow throughout your case. Remove the side of your case to increase ventilation. If that fixes the problem, you need to add more fans to your system. We recommend you suck cool air into the case at the front and blow warm air out the back at the power supply. For basic case-cooling duties, you don't need anything fancy, just make sure you get ball-bearing fans rather than sleeved fans. You can find a wide variety of case fans at PCtoys.com or just about any PC retail store, including CompUSA.

IMAGING DRIVES FOR EVERYONE

I remember reading an interesting article explaining how you configure your test beds for benchmarking. It explained how you set up the hard drives so that the system could be restored to the "just installed" state without having to reinstall Windows every time. What program do I need to do that, and is there anything special I need to know?

—STEVEN PAUSTIAN



Disk-imaging apps, such as *Drive Image*, let you capture a snapshot of a PC partition, which can be restored to your drive, or any other drive, whenever you want.

In the Lab, different editors use different products. Right now, PowerQuest *Drive Image*, Acronis *TrueImage*, and *Norton Ghost* are popular choices. Any of these products will take a snapshot of a partition on your drive and store it as an image file on another partition or drive. You can then dump the file back onto the original partition—or any other partition, for that matter—whenever you'd like to restore your drive to it's original pristine condition.

IS LINUX RIGHT FOR ME?

I'm pondering over which OS to put on my new system. I want to use Suse Linux, but I'd like to know if that's a better OS than Windows XP. I'm concerned with day-to-day operational reliability and security. I've never used Linux before, and I'm an avid gamer. Which should I go with?

—JAY

These days, there are some compelling reasons to use Linux as your primary OS. In addition to the competitive (and free!) word processors, spreadsheets, and image editors available for Linux, installing the OS is easier than ever before. The biggest downside to Linux is that it's more complex than Windows for use on a daily basis. Even relatively simple tasks, such as installing and running programs, can be difficult for a lifelong Windows user to get the knack of.

Gaming on Linux presents its own set of problems. Right now, there are fewer games available on Linux than on the Mac, and you can count the number of Linux-ported A-list titles on one hand. While there are Windows emulators that will let you play some DirectX games on Linux, you're better off setting up your PC to dual-boot Windows and Linux.

Even if you aren't a gamer, dual-booting is the best option for the Linux curious. Once you've set up the dual-boot, you'll be asked to choose between Linux and Windows every time you start your PC. Until you feel confident with Linux, you can switch back and forth between the two OSes as fast as you can reboot.

To set up a dual-boot drive, install WinXP first, making sure you create two partitions on the hard drive when prompted. Once XP is up and running, you can install Linux on the other partition using the Suse boot disks.

ANALOG OR DIGITAL FOR THE BEST SOUND?

I just got a new Area 51 system from Alienware with an Audigy 2 Platinum soundcard and Logitech Z-680 speakers. What cable do I need to plug into the digital connector on the soundcard and the speakers? Both ends look the same, but they're different. The analog sound is good, but digital sound is what I really want.

—MARK SCHUETZ

What you need is a Toslink optical connector, and it can be found at most electronics and audio stores. The optical input on the speakers should be identical to the optical output on the soundcard. It doesn't matter which end of the cable goes with which connector. If you're having problems connecting the cable, either the cable is misaligned or one of the connectors is defective.

That said, the best option for Audigy users is the analog connectors. The Audigy doesn't encode DirectSound3D audio streams into the DolbyDigital 5.1 format that digital speakers require. Instead, 3D positional data is discarded and all sound is sent over the digital connection in a stereo format. That means your expensive 5.1 speaker set is functionally identical to a 2.1 rig for games, if you use the digital output. As a general rule, you should always use the analog connection with PC speakers.

The only exception to the "use analog" rule involves nForce mobos sporting the MCP-T southbridge, which has integrated sound. Those boards can encode DirectSound3D into a Dolby Digital 5.1 stream in real-time, and work best in digital mode.

> *"EVEN IF YOU AREN'T A GAMER, DUAL-BOOTING IS THE BEST OPTION FOR THE LINUX CURIOUS."*

SCRATCHY SOUND

Whenever I play WMA or MP3 files saved on my hard drive and there's any short intense hard drive activity, I get a scratchy spitting sound from the speakers.

CD Audio works OK and DVDs play fine except for a short spit in the sound when the DVD starts up. Another oddity is that the Windows startup WAV file stutters as soon as the desktop appears. I've updated the drivers for my Audigy Gamer, RAID array, and motherboard (an Abit KT7A with HPT 370 UDMA RAID controller).

—KARI VAHAAHO

Your Abit KT7A-RAID motherboard uses the VIA KT133A chipset, which includes the VIA VT82C686B southbridge. The 686B southbridge is well known for being incompatible with the Sound Blaster Live! and Sound Blaster Audigy cards. (Most of the problems are related to the Live!, and involve the interaction between the Live! and VIA southbridge when transferring data.) VIA blames Creative Labs, and Creative Labs blames VIA.

Originally some mobo manufacturers tried to correct it, but VIA finally released 4-in-1 drivers that detected the presence of a Sound Blaster Live! and made appropriate corrections. Abit goes even further, offering three possible fixes: The first is to try the latest 4-in-1 drivers. The second is to adjust the PCI timing in the motherboard: Try setting the PCI Master Read Caching to "disabled;" the PCI Delay Transaction to "disabled;" and the PCI Master Bus Time-Out to "0" (or variations of these settings).

Finally, you can install a patch that adjusts the PCI latency on some VIA-equipped mobos. The patch, written by George Breese, is available at www.georgebreese.com/net/software.

FYI: We've also heard of people who were able to fix the problem by disabling ACPI in the BIOS. ■

There comes a time in every young man's life when he must put away the toys of his childhood and focus on the important things, like getting an old dot-matrix printer to work. This is where the Doctor can help. If you've got a PC problem, send an e-mail to **doctor@maximumpc.com**. Unfortunately, the Doc can't answer every e-mail, just the ones that are printed in the magazine.

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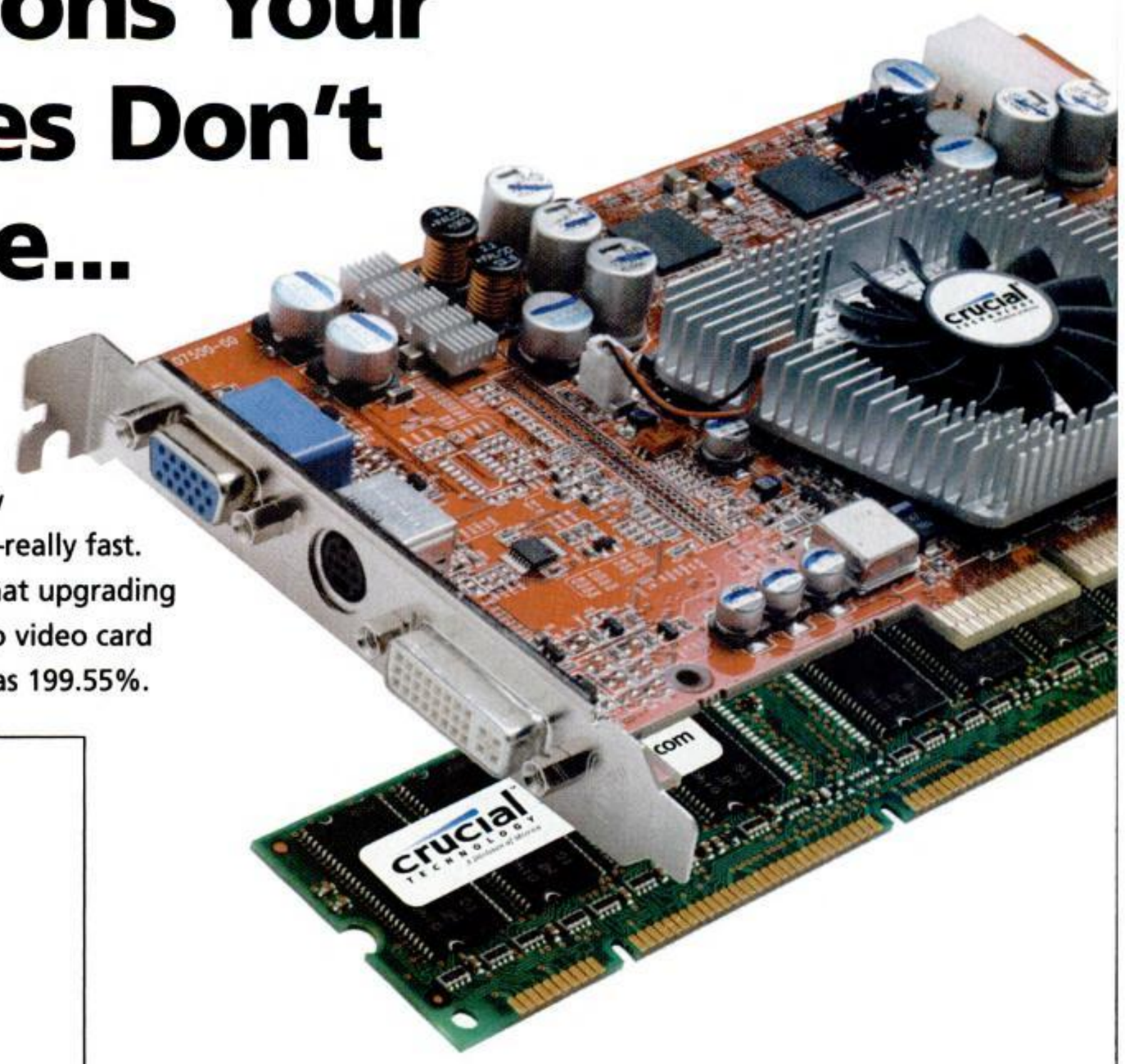
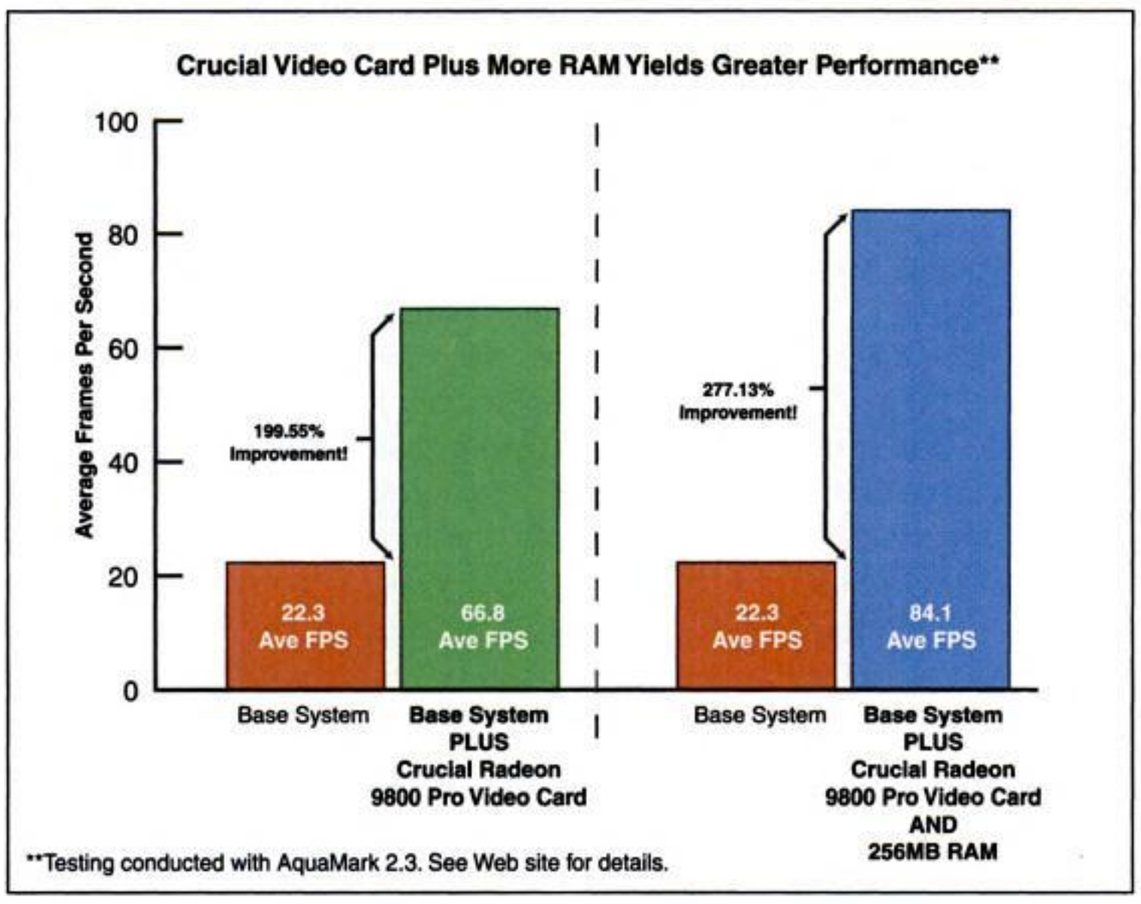
Two Secret Weapons Your LAN Party Buddies Don't Want You To Have...



New tests reveal the power of this killer combo!

Okay, the first "secret" isn't really so secret. You probably know very well that the Crucial Radeon™ 9800 Pro video card is fast—really fast. In fact, tests conducted by the Crucial Performance Lab show that upgrading from a GeForce2 GTS 32MB card to the Crucial Radeon 9800 Pro video card can improve average frame rate benchmark scores by as much as 199.55%.



**Testing conducted with AquaMark 2.3. See Web site for details.

The second secret revealed!

But the tests showed something else. Something so subtle, we're embarrassed to say we almost missed it. According to the tests, maximum performance can be achieved by upgrading *two components at the same time*—the video card and the RAM. With the Crucial Radeon 9800 Pro video card and an additional 256MB of RAM, our test system showed a 277.13% improvement over the base system in average frame rate benchmark scores.

So now you know. Upgrade your video card to a Crucial Radeon 9800 Pro and get a big boost in performance. Throw in some more RAM while you're at it, and get a bigger boost in performance. Now that's a killer combo your LAN party buddies will be drooling over!

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*See Web site for details.

Prices may vary according to specific system requirements. The price listed was valid on 7/7/03 when we sent this ad to the publisher; however, prices may have dramatically increased or decreased since then. Visit the FAQ section of Crucial.com to learn more about why memory prices go up and down.

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How To...

A step-by-step guide to tweaking your PC Experience

SHARE YOUR BROADBAND CONNECTION

MAXIMUMPC
TIME TO COMPLETION
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HOURS MINUTES

DSL, cable, or satellite. Here's how to pipe it through every PC in your home

BY WILL SMITH

Most broadband Internet connections are fast enough to accommodate 10 stations, not just a single, lonely PC. So, if you have multiple PCs in your house, it's easy to share your broadband connection among them. And you're not limited to only PCs. Your broadband-fueled home network can connect to game consoles, MP3 players, and anything else that speaks TCP/IP.

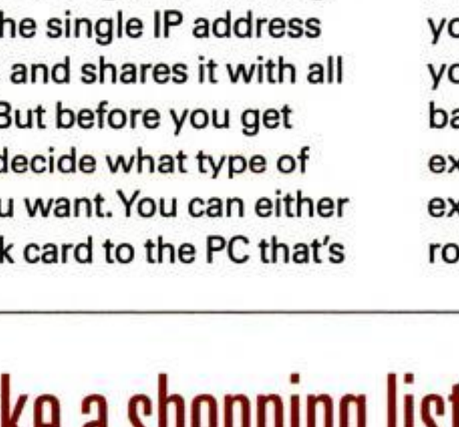
In this article, we'll show you how to share your connection using NAT routing, a scheme that takes the single IP address assigned by your ISP, and shares it with all your TCP/IP devices. But before you get started, you need to decide what type of broadband router you want. You can either add a second network card to the PC that's already connected to the net and use built-in Windows software to handle routing functions, or you can buy a relatively inexpensive stand-alone router-in-a-box that does the same thing. The strategy you choose depends on your needs.

The router-in-a-box provides easy 24/7 Internet connectivity to every PC in your home, but may preclude you from hosting multiplayer game sessions for certain games. On the other hand, if you use your PC as the router, none of the other PCs on your LAN will have access to the Internet if your router PC isn't powered up. That's the bad news. The good news is that using an existing PC for routing functions is less expensive and easier to configure than the router-in-a-box method. Most routers-in-a-box cost between $100 and $150, and include an integrated hub with four or five Ethernet ports. For a couple bucks more, you can add a Wi-Fi connection to the device as well.

Here are some rules of thumb: If you have just two devices that will connect to the Internet, you should use an existing PC and the integrated Windows software. If you want to connect three or more devices, it will be more convenient to use a stand-alone router. There are also some more advanced options—such as using a dedicated Linux or Windows 2000 Server box to do your routing—but they're more difficult to configure and only add features (such as web and e-mail servers) that most home users will never need.

STEP 1: Make a shopping list

Whether you choose to use a dedicated PC or a router, you'll need some additional parts, the first of which is a hub, a device with multiple Ethernet ports that lets you connect more than two devices to a network. You'll need a hub with one port for each device you intend to wire in. Wireless devices don't need their own ports, but your wireless access point does, unless it's integrated into your router. You can daisy chain multiple hubs together, but you should leave yourself some room for expansion.



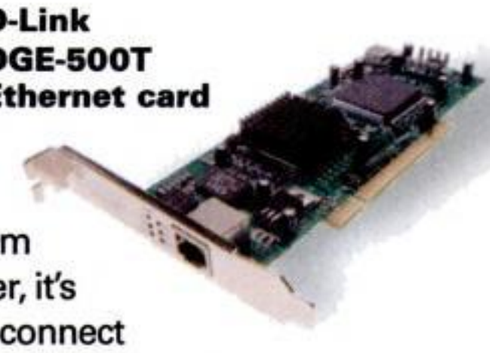
Linksys router

In addition to the hub, you'll need an Ethernet network card (NIC) for each device you want to connect. Most PCs ship with Ethernet support built directly into the motherboard, but you should confirm that each candidate for your network is Ethernet-ready before you go to the store. An Ethernet port looks like a wide phone jack, and usually has a pair of lights beside it. You should be able to purchase a good PCI Ethernet card for less than $30. And remember, if you're going to use your PC as the router, you'll need two network cards for that machine.

CAT-5 Ethernet cables

Unless your network is going to be 100 percent wireless—which we don't recommend—you'll need a segment of CAT-5 Ethernet cable for each PC you intend to connect to the network. You'll also need one segment to connect the router to your broadband modem, and one segment to connect the router to the hub or wireless bridge (if it's not integrated in the router). Make sure you have some slack in the cables, especially if you plan to run them around at floor level. You don't want to trip over a cable and destroy your entire network.

If you want to network some PCs that are particularly far away from your router, it's easier to connect them wirelessly. Right now, 802.11b and 802.11g wireless devices offer the best balance of speed, cost, and range. The newer 802.11g devices provide faster connections than 802.11b, but we've experienced some compatibility problems with all the 802.11g products we've tested to date. Regardless, if you want to make part of your network wireless, you'll need either a router that includes 802.11b or 802.11g support, or a stand-alone wireless bridge. Of course, you'll also need wireless network cards for each device you want to connect wirelessly.



D-Link DGE-500T Ethernet card

To sum up, this is your shopping list:

- Either a stand-alone router (like the Linksys WRT54G), or a PC with Windows ME,

Continued on page 56

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YOU'VE CONCEIVED THE IDEA FOR THE PERFECT PC.

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- Space
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- Textures (iron, metal, industrial, etc.)
- Disco
- Movies

RULES: One entry total per individual. All entries must be received no later than September 30, 2003, with the winner being announced on or around November 5, 2003. Each of the judging criteria (craftsmanship, creativity, and originality) will be weighed equally at 33%. By entering this contest you agree that Future Network USA, Inc. and CompUSA may use your name, likeness, and web site for promotional purposes without further payment. The prize will be awarded and no minimum number of entries is required. Prize won by a minor will be awarded to their parents or legal guardians. Neither Future Network USA nor CompUSA is responsible for damages or expenses that the winner might incur as a result of the Contest or the receipt of the prize, and the winner is responsible for income taxes based on the value of the prize received. The winner's name may also be obtained by sending a stamped, self-addressed envelope to Future Network USA, Inc., c/o Case Modding Winner, 150 North Hill Drive, Brisbane, CA 94005. This contest is limited to residents of the United States. No purchase necessary; void in Arizona, Maryland, Vermont, Puerto Rico, and where prohibited by law.

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Continued from page 54

2000, or XP and two network cards

- A broadband connection that uses Ethernet to connect to your current PC
- An Ethernet cable for each PC you intend to connect, plus one cable for the router and one for the hub
- A network card for each PC you intend to connect to the wired LAN
- (Optional) A Wi-Fi bridge and Wi-Fi network cards for each PC you want to connect wirelessly to the network

If you're going to get a stand-alone router, feel free to skip Step 2B. Otherwise, read on.

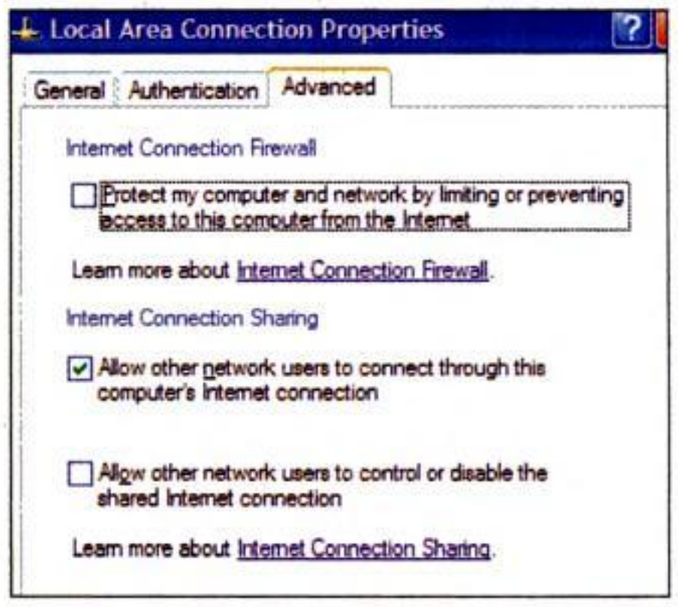
STEP 2A: Configuring your LAN using an existing PC and Internet Connection Sharing

Now that you've decided to use an existing PC as your router, it's time to get to work. Assuming the PC you want to use as the router is already hooked up to your broadband connection, all you need to do is install another network card in the PC, reconfigure some cables, and make a few minor software tweaks.

Power down your PC and open the case. Find an empty PCI slot and remove the slot cover. Install the new network card, screw it into place, and replace the case cover. If you have some sticky labels, it's a good idea to label the network connections, in case you ever have to disconnect everything. Label the card you just installed "Internal" and the original network card "External." Once you've restarted Windows and installed the drivers for your new card, you can move to the next step, software setup.

Installing Internet Connection Sharing is very simple in Windows XP. Go to the Control Panel, then Network Connections, and right-click your *external* network connection. This will most likely be named Local Area Connection or Local Area Connection #1. Essentially, you want the network card that's connected to your cable or DSL modem. Go to Advanced, then check the box labeled "Allow other network users to connect through this computer's Internet connection."

That's all there is to it. Now you need to take one of the Ethernet cables you bought and run it from the Internal network card on the PC to the hub. If you can connect to the Internet—try browsing to **www.google.com** as a test—and see twinkling lights on the hub, you can safely proceed to Step 3.



If you've got a couple computers that need a network connection, and don't mind running your main PC when they need access, Internet Connection Sharing is built into Windows, and is easy to use.

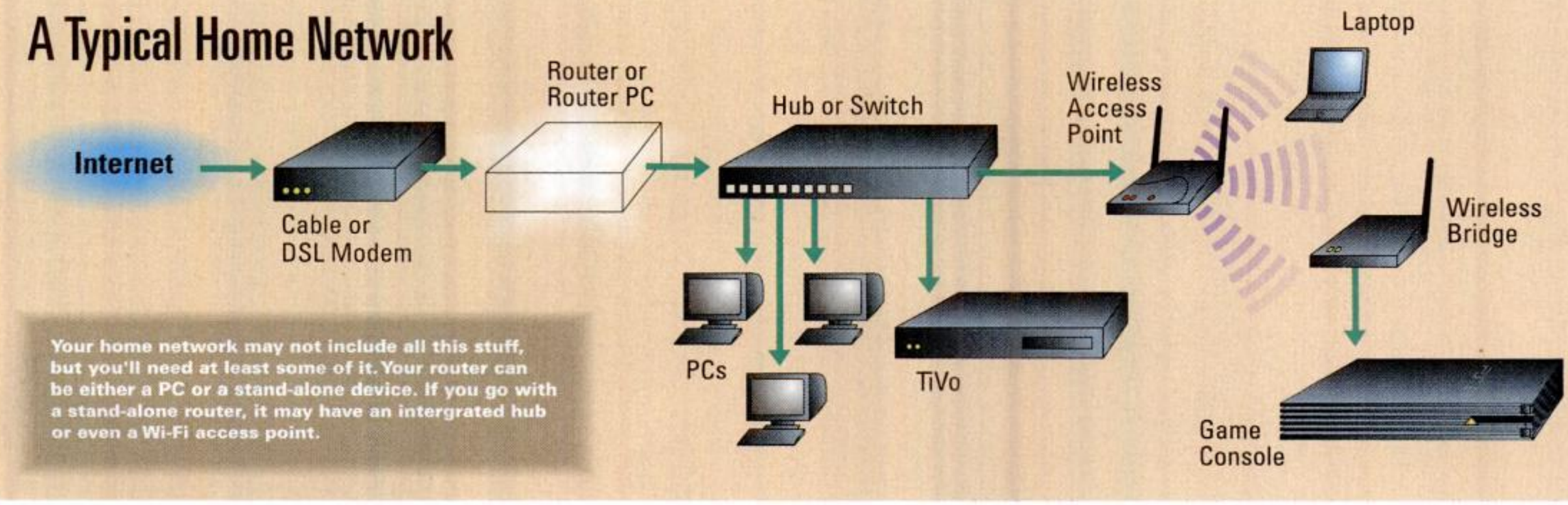
STEP 2B: Configuring your LAN using a stand-alone router

Before you begin configuring your router, you'll need your ISP's settings. When you first signed up for your broadband connection, you should've received an e-mail or letter with all the information about your settings. Most ISPs use dynamically configured IP addresses, but if you have a static address, or if you have to log in to your broadband connection using PPPoE, you'll need to have your IP info and login. If you can't find that info, call your ISP's support line to request it.

Now you'll want to connect your PC to the router. Connect your cable or DSL modem to the port labeled "WAN" or "Internet" on the router. If you're using a stand-alone hub, you need to connect the router's LAN port to your hub and run another Ethernet cable from one of the ports on the hub to your PC's network card. If the hub's integrated into your router, you can just run a line between your PC and a spare port on the router.

Now you should follow the instructions the manufacturer provides for configuring your router. In most cases, you'll need to point your web browser to a special, private IP address, and then enter the info your ISP provided. Once your router's set up, and you can connect to the Internet from your PC—try **www.google.com** to test—proceed to Step 3.

A Typical Home Network



Your home network may not include all this stuff, but you'll need at least some of it. Your router can be either a PC or a stand-alone device. If you go with a stand-alone router, it may have an intergrated hub or even a Wi-Fi access point.

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STEP 3: Running cables

Now your local network has an Internet connection, but only one of your PCs is connected to it. What you need to do next is connect your other PCs and networked devices to the LAN. If they're in the same room, it's as easy as running a long Ethernet cable from the hub to the other PCs, but it's not always that simple.

There are a few tricks that can make longer cable runs easier. If your home has carpet, you can usually squeeze an Ethernet cable into the gap between the baseboard and the carpet. By doing this, you can get a cable from one side of a room to the other completely out of sight. Make sure you leave enough slack at both ends of the cable in case you need to move the PC or hub.

It's easy to run cables to a nearby room if you have a crawl space under your house, even if you don't want to drill holes in the floor. If you have central air or heat, and your home has floor registers, you can usually slide an Ethernet cable between the edge of the vent and the floor. Make sure you don't strip the cable when you're pulling it past the jagged metal vent.

Squeezing a cable into the gap between a heating duct and the floor is an easy and nondestructive way to get cables into your crawl space.

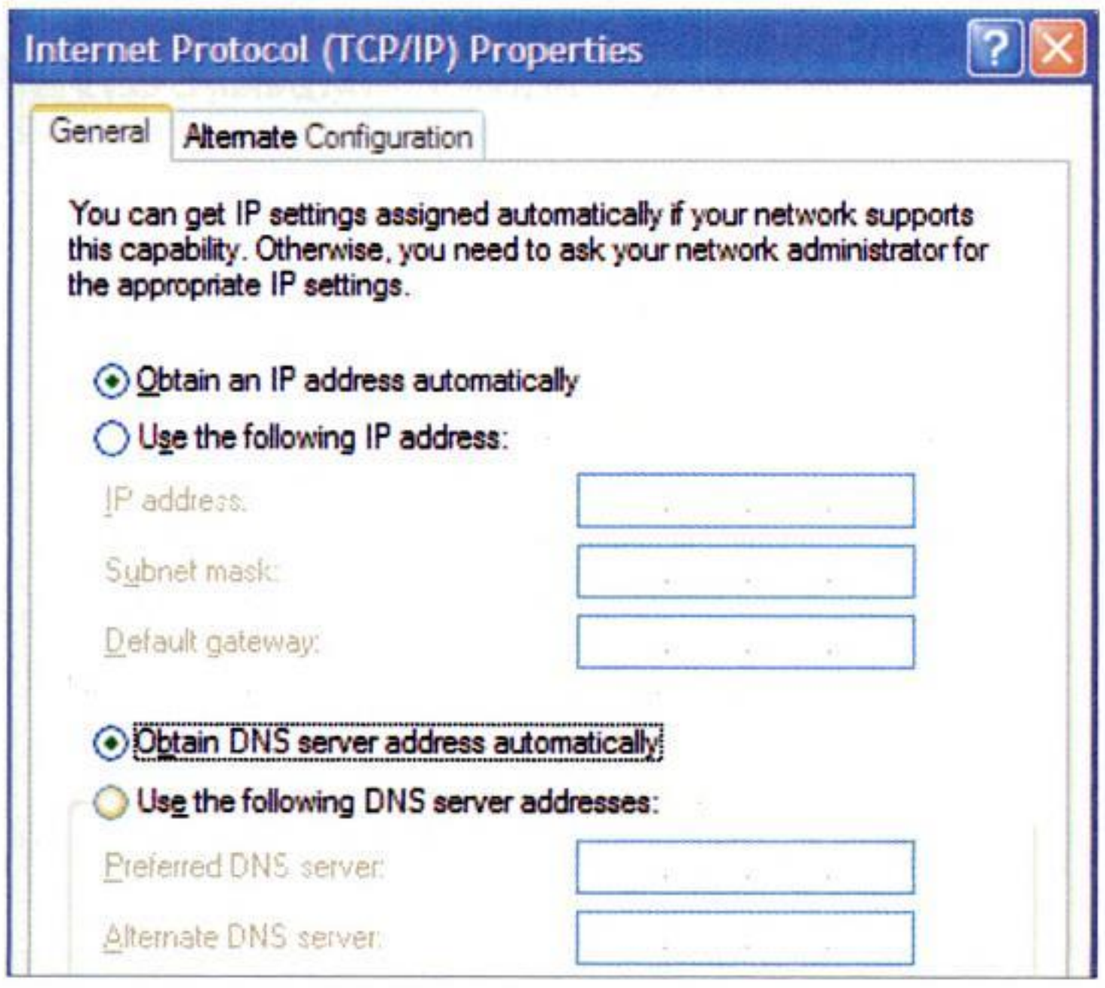
If the above tips won't work in your home, you can run cabling around the perimeter of your room. Most hardware stores sell small clips that you can nail into the baseboard to keep your Ethernet cables against the wall and out of the way. If you have to run a cable across a doorway, make sure you tape it to the floor so that no one will trip over it.

Remember: You can connect additional hubs to the first one. So, if you have a room a long way from your hub with two (or more) PCs, there's no reason to run two Ethernet cables to that room, just run one cable to that room, connect it to a hub, and then connect the devices to the new hub.

If you don't want to muck about in your crawl space, you can also use a wireless link to get the job done, but it will be expensive. If you already have a wireless access point, you'll just need to pick up a Wi-Fi bridge—they're frequently called Wireless Game Network adapters, and cost about $120. If you don't already have a wireless access point, you can get a pair of bridges and use them as a cable-less cable.

STEP 4: Configuring your individual PCs

To configure your "peripheral" PCs to connect to the Internet, all you need to do is tell them to automatically get an IP address from your router. Go to the Control Panel, then click on Network Connections. Right-click the Local Area Network connection and select Properties. Double-click TCP/IP settings, and make sure both "Obtain an IP address automatically" and "Obtain DNS server address automatically" are checked. Keep pressing OK until you're out of Network Properties. Some versions of Windows will prompt you to reboot after making this change. Test the Internet connection by going to a web site that's always up, such as Google.com.



Configuring your other Windows PCs to connect to the network is as easy as flipping a switch.

STEP 5: Share and enjoy!

Once the router's up and running, you're not limited to connecting just PCs. Increasingly, home entertainment devices come with Ethernet ports so you can connect them to the Internet as well. Xbox, PS2, and GameCube all offer Internet-based multiplayer gaming, and PVRs like ReplayTV and TiVo can download scheduling info over an Ethernet connection (which is nice because this doesn't tie up your phone line).

If sharing your network connection with every PC in your home isn't enough for you, it's easy to add an 802.11b or 802.11g access point to your LAN so you can have wireless access anywhere in the house. You can also add a basic file server to store your music, photos, and movies for easy access from anywhere in the house! ■

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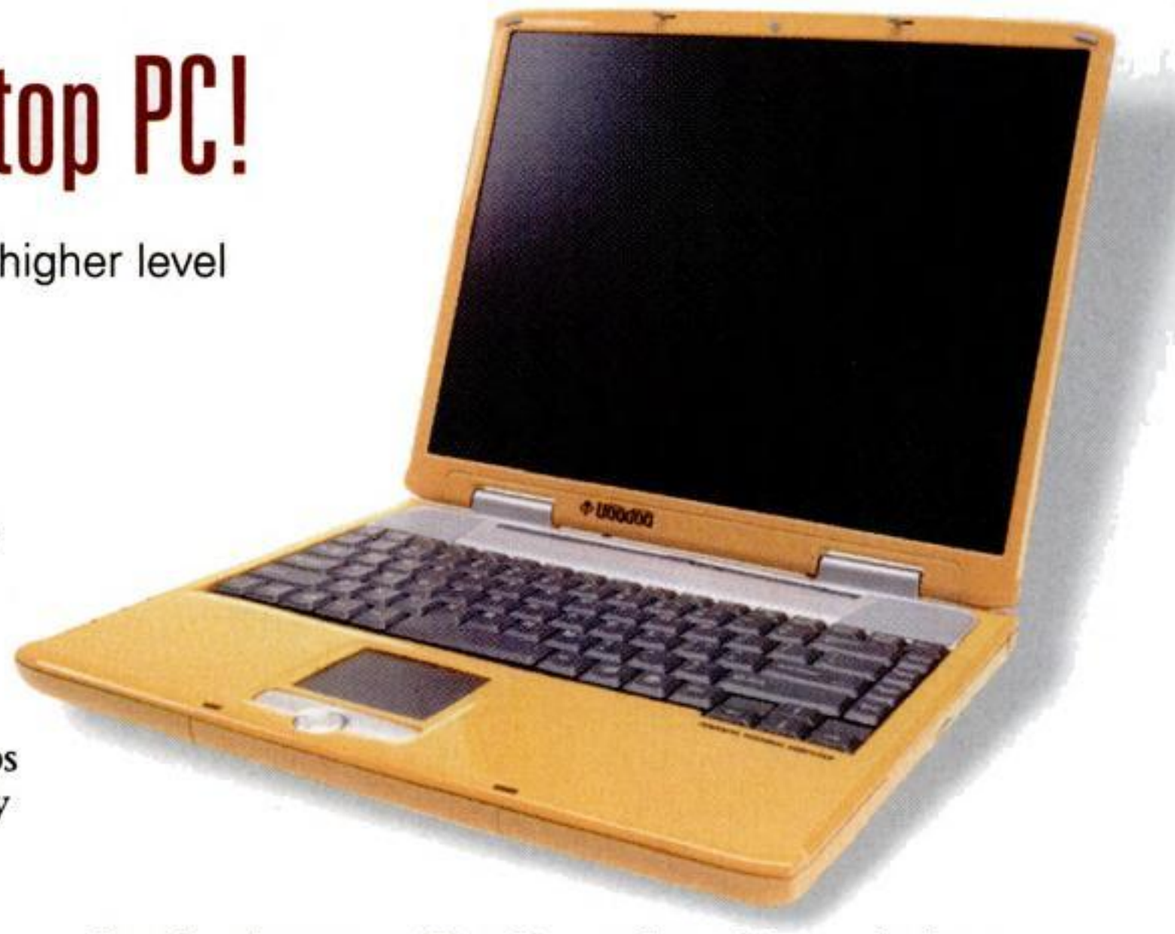
In the Lab

A behind-the-scenes look at Maximum PC testing

By Golly, It's Like Testing a Desktop PC!

Voodoo's new Envy M460 takes notebook performance to a higher level



Notebook users with old graphics chips and slow hard drives will be green with envy over this yellow Voodoo M460.

This month, Voodoo PC handily wins the *Maximum PC* award for "OEM to Send Us the Most Cutting-Edge Gear for the Month of September." Not only did the Canadian manufacturer of PC fineries send us its special cooling system for Dream Machine 2003, it also gave us our first taste of the new Envy M460 notebook.

Yes, Voodoo sells notebooks. *Mean* notebooks. Mean notebooks with never-before-tested graphics chips and hard drives. We're talking about ATI's new Mobility Radeon 9600 3D accelerator, and Hitachi/IBM's 7K60 hard drive. The GPU hits frame rate heaven, and the drive spins at 7200rpm. That's right, power users, the 5400rpm notebook barrier has been broken! The Envy notebook we received was a non-reviewable prototype, but most of us would gladly have kept it for daily use, that's how fast it ran.

It's difficult to accurately isolate notebook graphics during testing. After all, it's not as if anyone can yank the GPUs from a bunch of notebooks, and put them in a common testing platform. So, to see how the new ATI graphics chip stacks up, we grabbed a Dell Inspiron 8500, and updated it with the latest BIOS and drivers from Dell's web site. This Inspiron features the once-mighty GeForce4 4200 Go graphics chip.

We would've liked to have tested the new ATI graphics against a notebook with nVidia's GeForce FX Go5600 chip, but one wasn't available at press time.

Also, we must point out that our 6-month-old Dell testing dummy is running a CPU that's clocked 8 percent slower than the Voodoo's CPU. What's more, the Dell's 5400rpm hard drive spins roughly 25 percent slower than the 7200rpm drive in the Voodoo notebook. And, of course, there are major clock speed differences between each notebook's graphics parts as well.

On top of all that, there's the oddity we discovered when we updated Dell's drivers. The Inspiron 8500 scored 9,079 in *3DMark2001 SE* with the drivers we reviewed in April. With the current drivers, the score dropped to 7,567.

OK, so we know that the Dell Inspiron 8500 is a rather easy target for the new Voodoo Envy M460. But all variables aside, the old nVidia 4200 graphics can't stack up against the new DirectX 9–class Radeon Mobility 9600. In *3DMark2001 SE*'s all-important DX8.1 pixel and vertex shader test, the GeForce4 4200 Go produced a score some 62 percent slower than the Mobility Radeon 9600.

The nVidia part experienced a similar pummeling in *3DMark2003*. Is it fair to compare a DX8.1 part with a DX9 part? Indeed it is—at least when you're talking about notebooks, which essentially defy graphics upgrades. It's patently clear that the Radeon Mobility 9600 is now the fastest mobile gaming gun in town.

Also of interest was Voodoo's 7200rpm hard drive. In the *HD Tach* hard drive benchmark, we saw a 30 percent improvement over 5400rpm drives. Voodoo's spindle speed likely contributed to its superior *SYSmark2002* scores as well.

The lesson here is simple: In all future notebooks, we want to see 7200rpm hard drives and Mobility Radeon 9600 graphics. *You read it here first.*

DARE TO COMPARE: DESKTOP REPLACEMENTS

	Voodoo Envy M460	Dell Inspiron 8500
CPU	Pentium 4 M	Pentium 4 M
CPU speed	2600MHz	2400MHz
Core logic chipset	SiS648DX	Intel 845MP
RAM	512MB	512MB
Hard drive	60GB Hitachi 7K60	40GB Hitachi 40GNX
HD cache	8MB	8MB
HD spindle speed	7200rpm	5400rpm
GPU	Radeon Mobility 9600	GeForce4 4200 Go
GPU core	351MHz	199MHz
GPU RAM	417MHz	405MHz
3DMark2001 SE Overall	**9,258**	7,567
3DM2001 Game 4	**48.5**	18.5
3DM2003 Overall	**2,614**	1075
Quake III MPC Demo	**96.6**	77.6
HD Tach Avg. Transfer	**29MB/s**	20MB/s
SYSMark2002 Overall	**235**	198

Best scores are bolded.

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Cooler Master Musketeer

Hardcore gearheads might be living on the new digital frontier, but we're still utterly fascinated with analog gauges—like Cooler Master's new Musketeer set, which gives you three analog meters that display audio, temperature, and voltage levels.

One slider on the Musketeer lets you adjust the sensitivity of the VU meter. A second slider lets you adjust the voltage to any standard three-pin fan. The temperature sensor is a simple corded sensor that can be placed anywhere in your case, or slipped between your CPU heatsink and CPU core. To operate the VU meter, you must run a pass-through cable to the audio output of your soundcard. **www.coolermaster.com, $49**

ATI Radeon 9100 IGP

Pixel and vertex shaders for the masses

What do you do if you have the kind of budget that makes a $75 Radeon 8500 LE seem expensive, but you want a system that plays vertex and shader games? ATI thinks it has the answer with its Radeon 9100 IGP. With a P4 core logic chipset that supports both 533MHz and 800MHz bus CPUs, and dual-channel DDR, ATI claims the prize for being the first vendor to offer pixel and vertex shaders within an integrated chipset.

The Radeon 9100 IGP is aimed at the $85 motherboard, not the $85 mouse pad market. The company has great intentions, but how's the performance? Nothing to e-mail home about. We saw a Radeon 9100 IGP hit 5,268 in *3DMark2001 SE*. In game 4, it managed a sad-sack 15.5fps at 1280x1024. We also ran *3DMark2003* for kicks and saw a score of 798. It's no barn burner, for sure, and well short of the performance we saw in graphics cards from 18 months ago. Fortunately, 9100 IGP boards support AGP slots for easy upgrades. It's a dismal performer, but in the land of the blind, the one-eyed man is king, and for integrated graphics, it's the best you can get today.

Best of the Best

As of September, 2003

Here are our current top picks for each hardware category. Red text indicates first month on chart. This month, there are no major changes, although Pioneer's DVR-A06 bumps off the Sony combo DVD burner, and we've also made Apple's third-generation iPod our top MP3 player. We're being conservative with our Intel motherboard pick. We've been given strong hints that the D875BZ will run with the initial release of the new Prescott CPU later this year. We haven't yet had that same confirmation for other motherboards.

High-end videocards:
nVidia GeForce FX 5900 Ultra/ATI Radeon 9800 Pro 256

Budget videocard:
ATI Radeon 9600 Pro

Do-everything videocard:
All-in-Wonder Radeon 9800 Pro

Soundcard:
Sound Blaster Audigy 2 Platinum

Serial ATA hard drive:
Western Digital 360GD Raptor

Parallel ATA hard drive:
Western Digital WD2500JB

CD-RW drive:
Plextor PlexWriter Premium

DVD burner:
Pioneer DVR-A06

LCD monitor:
Sharp LL-1820

High-end CRT monitor:
Sony F520

Budget CRT monitor:
Cornerstone P1750

P4 motherboard:
Intel D875PBZ

Athlon XP motherboard:
Asus A7N8X Deluxe Rev 2

Portable MP3 player:
iPod 30GB

Photo printer:
Epson Stylus Photo 1280

Pocket PC PDA:
HP iPaq 5450

Palm OS PDA:
Palm Tungsten C

5.1 speakers:
Logitech Z-680

4.1 speakers:
Logitech Z-560

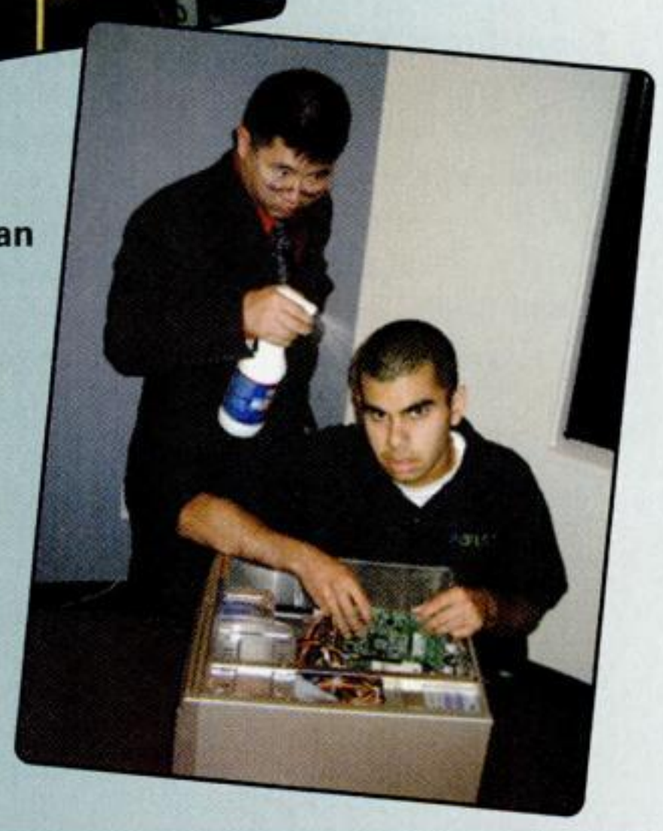
2.1 speakers:
Klipsch Promedia 2.1

The games we're currently playing: *Planetside, Star Wars Galaxies, Midnight Club 2, Battlefield 1942: Desert Combat Mod*

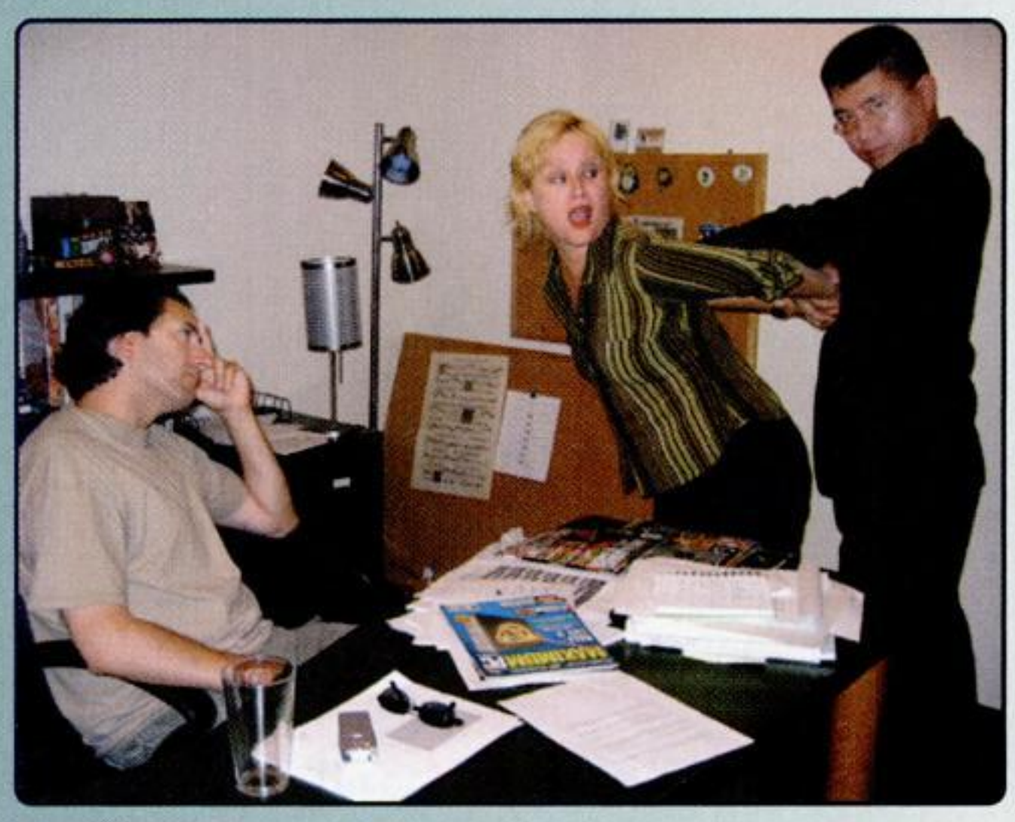
Internal Affairs

The magazine's newest intern, Dwight Looi, is a *serious* piece of work. Buttoned-up and by-the-book, he doesn't let our seasoned editorial staff get away with anything.

"Maximum PC Lab Regulation 24D clearly states, and I quote, 'The height of no cardboard box stack shall exceed the median height of the magazine's custodial staff.' Is this stack shorter than Mrs. Bernstein, Logan? Uh... I don't *think* so!"



"Hear me now, Omeed, and you can quote me on this, Omeed, because we'll both want this on record: Anti-static spray doesn't just protect our components—it makes us better people."



"I found her in the Lab, sir. Claims she's *Maximum PC's* art director. Claims she needed to take photos of me for a certain 'In the Lab' column called 'Internal Affairs.' Interrogation room, or do you want to handle this one yourself?"

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CyberPower Infinity 5900 Pro

All the right parts in all the wrong places

The Infinity 5900 Pro is as close to a budget system as we review at *Maximum PC*, but it's no slouch in the performance department.

We were persuaded to review the CyberPower Infinity 5900 Pro when it was described to us as a tweaked-out gaming rig boasting an 8x DVD-RW and a reasonable price tag. Unfortunately, CyberPower didn't deliver the system it promised.

For the most part, the Infinity 5900 Pro sports top-notch hardware, including a 3.2GHz Pentium 4 CPU, a 256MB GeForce FX 5900 Ultra videocard, and an Audigy 2 soundcard. Sadly, the company skimped on the hard drive and optical drives.

The 120GB Seagate Barracuda is a fast 7200rpm drive, but we've been spoiled by the 10,000rpm Western Digital Raptors appearing in RAID arrays lately. We won't automatically ding a system that ships sans RAID, but 120GB is a trifling amount of disk space for a high-performance gaming machine.

While we *could* live with the hard drive situation, the optical drive setup is a travesty. Instead of the 8x DVD burner we were promised, we got a Pioneer DVR-A04 drive. True, *Maximum PC* featured this drive in its Dream Machine—*back in 2002!* These days, this burner's a dog. The A04 burns *CD-Rs* at 8x. DVDs are burned at a paltry 2x! Not exactly what we were expecting. Further evidence of CyberPower's parts misrepresentation is found on the company's web site, where it plainly advertises the drive we received as a "DVD-RW 8X4X2X1," brazenly bucking the convention of listing DVD speed first. We'd be pretty steamed if we shelled out for an 8x DVD-RW and got a 2x DVD-RW instead. What's more, if the combo drive burns CDs at just 8x, why not make the second optical drive a stand-alone CD-RW capable of greater speeds? Instead we got a separate 16x DVD-ROM. It just doesn't make sense.

Fancy lights and a stock window only draw attention to a shoddy wiring job.

The included monitor and speakers didn't impress us. The analog-only Viewsonic LCD display has a slow pixel refresh rate, making it streaky and unsuitable for gaming. As for the Creative Inspire 6600 6.1 speakers, we'd rather use headphones. In fact, we've had headphones that get louder than the Inspires. Granted, we can't complain too much about extras in a system as inexpensive as this one.

Naturally, the Infinity isn't the fastest performer we've reviewed, but it can hold its own in a couple important categories. It's gaming performance in *3DMark2001:SE* Game 4, for example, was near-Dream Machine level, courtesy of Infinity's extremely overclocked GeForce FX 5900 Ultra. The Infinity's *SYSmark2002* score was only about 20 points lower than the Velocity Raptor's (reviewed in August), and the Raptor had the advantage of RAIDed 10,000rpm hard drives. A RAID array would've probably also helped the Infinity's *Premiere* score, a sub-par 335.

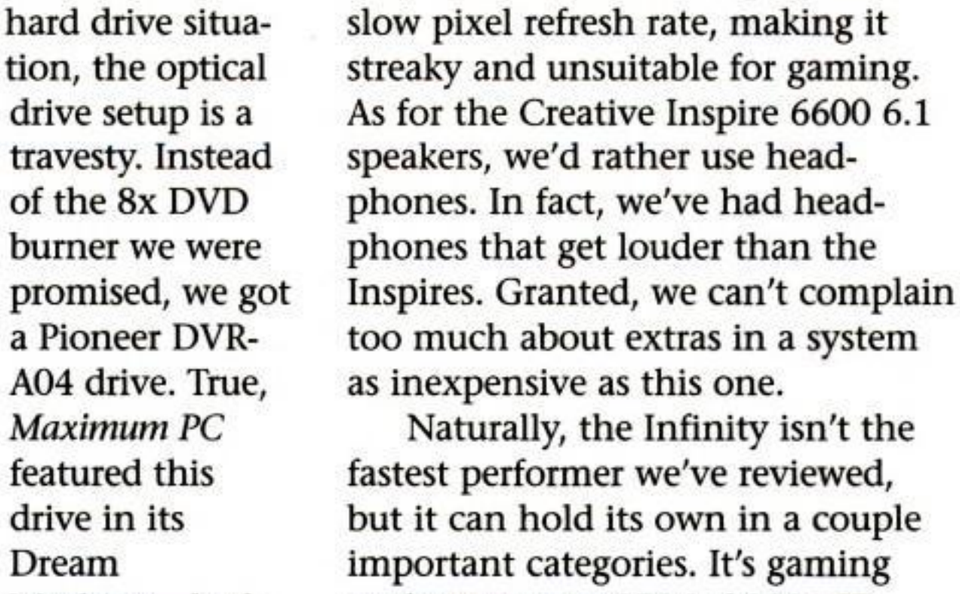
We were initially concerned about the reliability of the Infinity's overclocked GeForce FX 5900 because it uses only the stock nVidia cooler. At 530MHz and 460MHz, respectively, its core and memory are clocked almost as high as this year's Dream Machine's (the default clocks are 450MHz/425MHz). While we didn't experience any problems with the card in our system, we have to wonder if CyberPower can ship boards clocked at these speeds in quantity. After all, we tested five different FX boards before we found one that was sufficiently overclockable for Dream Machine 2003.

Despite its spurious 8x DVD-RW drive, slow CD-burning times, and puny storage configuration, we have to admit, the CyberPower Infinity 5900 Pro performs well and is a great value at $2200 (although as of press time we couldn't replicate this low price using the web site's configurator).

—WILL SMITH

UNDER THE HOOD

THE BRAINS	
CPU	Intel 3.2GHz Pentium 4C
Mobo	Intel Asus P4C800 (800MHz bus)
RAM	1024MB CORSAIR DDR400
I/O ports	Six USB 2.0 (two on front), serial, parallel, two FireWire, mic, line-in, three analog out, Creative digital out, MIDI in/out, joystick port
LAN	Intel Pro/1000 Gigabit Ethernet
DISPLAY	
Videocard	nVidia GeForce FX 5900 Ultra 256MB (530MHz/465MHz)
Monitor	Viewsonic UG800
STORAGE	
Hard drives	One 120GB Seagate Barracuda 7200.7
DVD-RW	Pioneer DVR-A04WB
DVD-ROM	Generic 16x DVD-ROM
AUDIO	
Soundcard	Sound Blaster Audigy 2
Speakers	Creative Inspire 6600
FINE DETAILS	
Case	Cybertec SX1040 Aluminum
Fans/extras	Three lit 80mm fans, one unlit 80mm fan, case window, one sound-activated cold cathode light w/ rear controls, two front mounted USB ports
BUNDLE	
Windows XP Professional	
BOOT: 47 sec	**DOWN: 11 sec**



Our zero-point system includes: an Intel D850MV motherboard, a 2GHz P4 CPU, 512MB PC800 RDRAM, a GeForce4 Ti 4600 videocard, and a Western Digital 1000BB hard drive (2MB cache).

MAXIMUMPC VERDICT 7

+ WONDER TWIN POWERS

Very good performance at a great price.

– STEPHANIE POWERS

Piss-poor wiring job, and a weird optical config, but what do you expect for $2,200?

$2,200 (with monitor and speakers), www.CyberPowersystem.com

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"...you've got yourself a PC that eats other gaming rigs for lunch"

- Tech Edge Aug 2003

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- > 120GB 7200RPM Serial ATA-150 Hard Drive 8MB Cache
- > NVIDIA® GeForce™ FX 5900 Ultra 256 MB Graphics Card
- > a.i. Aluminum Heatsink Hard Drive Cooler
- > Sony Black 16X/48X DVD-ROM Drive
- > Sony Black 52X24X52 CD-RW Drive
- > Creative Sound Blaster® Audigy 2™ 6.1 Audio
- > High Performance System Case Cooling Fan Options
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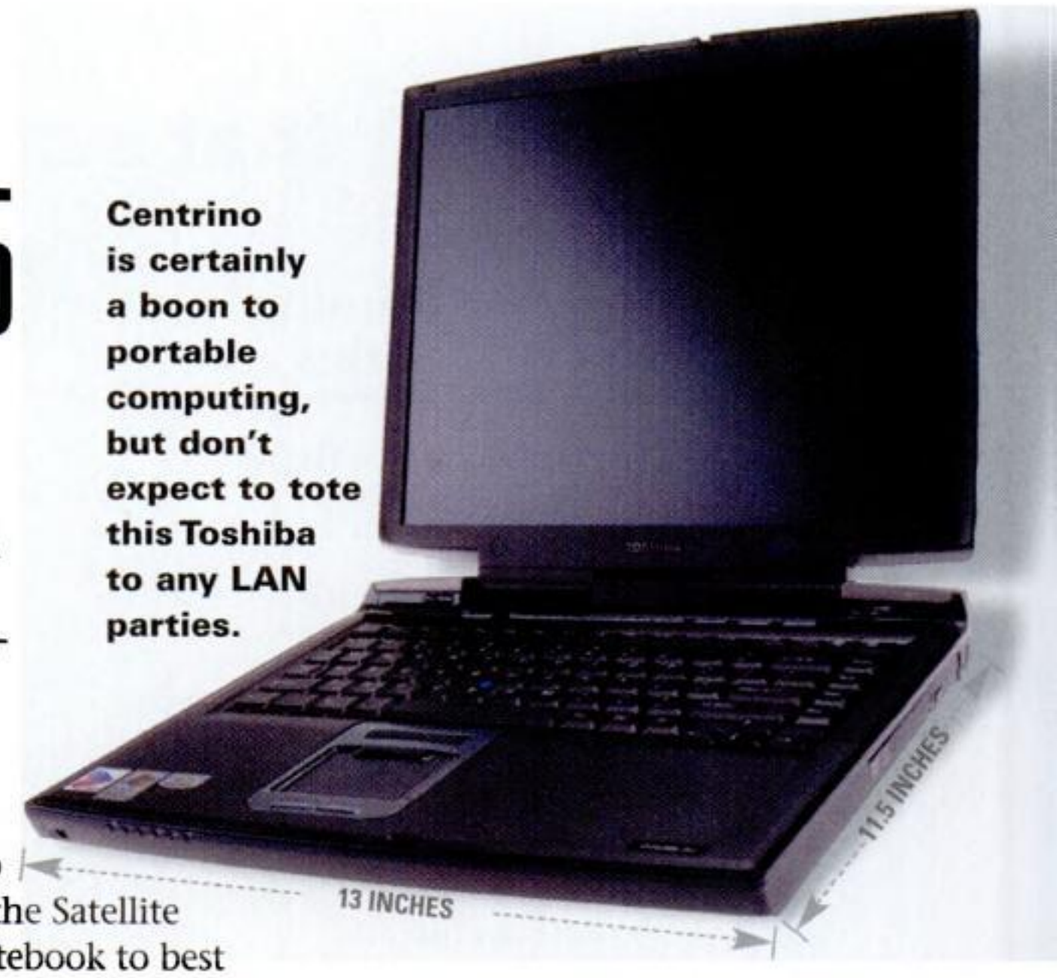
Toshiba Satellite Pro M15-S405

New Intel CPU delivers exceptional battery life and good power



Centrino is certainly a boon to portable computing, but don't expect to tote this Toshiba to any LAN parties.

If you want battery life and lots of it, Toshiba's Centrino-powered Satellite Pro is your new best friend. Centrino is Intel's blanket term for a trio of new mobile technologies. The Centrino label strictly denotes the presence of a Pentium M processor, 855 core-logic chipset, and Intel PRO/Wireless 2100 chip working in concert.

Combining elements of the Pentium III and Pentium 4, the Pentium M was designed from the ground up to be a battery-friendly CPU. Its whopping 1MB of L2 cache, for example, only receives power during cache hits, limiting the total amount of electricity required by the proc. In fact, intelligent clock gating turns off large portions of the CPU and chipset when not in use.

All in all, the large L2 cache, a 400MHz system bus, and support for SSE2 special instructions give the Pentium M a major performance advantage over the Pentium III.

True, a 1.4GHz Pentium M can't offer all the performance of a 3GHz desktop chip. But the Toshiba's power consumption-to-performance ratio can't be ignored. For our standard battery run-time test, we measure how long a notebook can play the near-interminable director's cut of *JFK* (screen brightness is set to 50 percent, and audio is piped through a set of headphones). Living up to Centrino's promise, the Satellite Pro became the first notebook to best our zero-point Dell Inspiron 8200 notebook in this challenge. Consider that the Toshiba scored its win with a *single* battery, while the Inspiron 8200 had two large capacity batteries when it set its record. The Satellite Pro could likely run for five hours or more under less taxing everyday workloads.

In *SYSmark2002* with the notebook running on AC power (and thus its fastest CPU speed), the 1.4GHz Toshiba scored 152 points, on par with systems running 1.7GHz P4s.

In other tests, the Toshiba's M proc did even better. In *Premiere*, it finished our CPU-heavy action script in 537 seconds, or 34 percent faster than the 1.7GHz P4. We've long suspected that the aged code in *Premiere 6.0* favors CPUs with shorter pipelines and better floating-point performance (like the Pentium III and Athlon XP, respectively), but the Pentium M's secret sauce definitely provides some sort of boost. The Toshiba completed our *Photoshop 7.0* scripts in just 53 seconds—better than the 91 seconds of our zero-point notebook.

All these cheery performance numbers are good and fine, but let's put them in perspective: The 2.4GHz P4M Dell Inspiron 8500 that we tested in April trumped the 1.4GHz Centrinoed Toshiba in every test, save battery run-time. For example, the Inspiron 8500 hit 198 in *SYSmark2002*—that's about a 25 percent performance differential. As for our *Quake III* test, we couldn't nail down an official score because the Toshiba's screen hits just 1024x768 and not the 1280x1024 required by our benchmark. Still, we did run the demo at 1024x768 and got 57.3fps, which is pretty sad in the big scheme of 3D graphics.

Feature-wise, you get a 24x CD-R/DVD-ROM combo drive, two PC Card slots, FireWire A, and High-Speed USB. A combination track pad/joystick setup lets you choose your preferred input method. The audio in the notebook is good for a portable, but the LCD's off-axis viewing was poor, and the 1024x768 res is too low for a notebook this large.

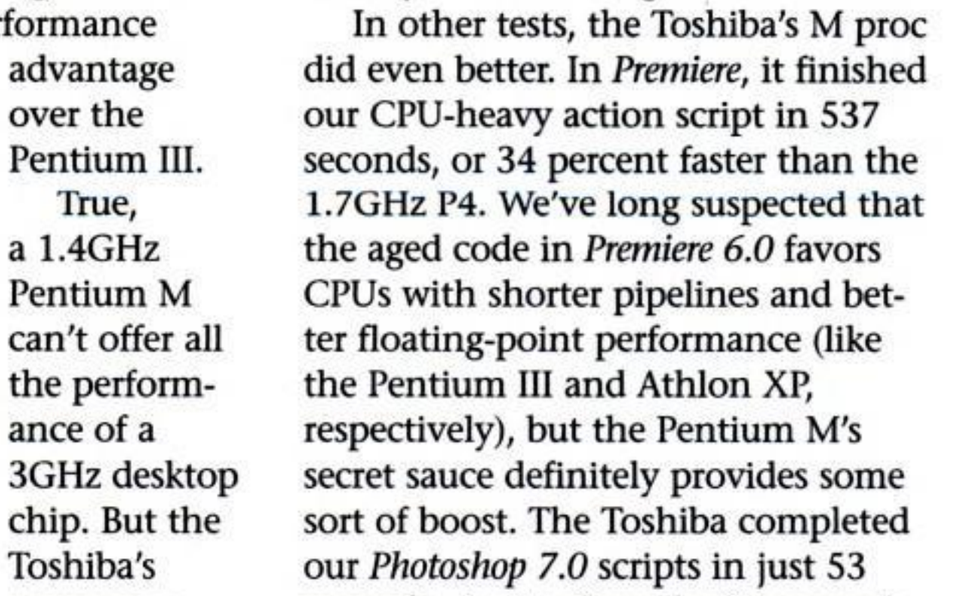
We were pleased with the notebook's Wi-Fi reception, but even Intel admits that its Wi-Fi chip doesn't offer much power saving or fidelity advantage over other companies' parts.

In our opinion, the Satellite Pro is too bulky a home for Centrino, but we're nonetheless impressed with the battery life. This notebook can certainly fend for itself in the absence of a wall outlet.

—GORDON MAH UNG

UNDER THE HOOD

THE BRAINS	
CPU	1.4GHz Pentium M riding Intel 855MP chipset
RAM	512MB DDR266
I/O ports	Two High-Speed USB, one FireWire A, two PC Card slots, one SD port, Fast Ethernet, composite video out, DB-15 out, parallel port
Modem	Toshiba V.92
LAN	Intel PRO/100 VE Fast Ethernet, Intel PRO/Wireless LAN 2100
DISPLAY	
Video	nVidia GeForce4 420 Go
Display	15.1-inch (1024x768@32-bit)
STORAGE	
Hard drive	Toshiba 30GB MK4019GAX
CD-RW/ DVD-ROM	Matshita UJDA740 DVD/CDRW
SOUND	
Audio chip	SigmaTel AC97
WEIGHT	
Lap weight: 6.75 pounds	
Carry weight: 7.35 pounds	
BUNDLE	
Windows XP Home, Drag and Drop CD, DVD-RAM Driver, WinDVD 4, Norton Antivirus 2003, Quicken 2003, Microsoft Works 7.0	
BOOT: 25 sec.	**DOWN: 13 sec.**



Our zero-point notebook is a Dell Dimension 8200, and includes a 1.7GHz P4-M CPU, 256MB DDR266, a 64MB 128-bit DDR GeForce4 Go graphics chipset, and a 5400rpm IBM Travelstar 60H hard drive.

MAXIMUMPC VERDICT 8

+ CRYSTAL GEYSER

Mega battery run-time, good audio.

– POND WATER

Could be slimmer and lighter and sport a better screen.

$1,900, www.toshiba.com

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1999, 2000, 2001, 2002, 2003

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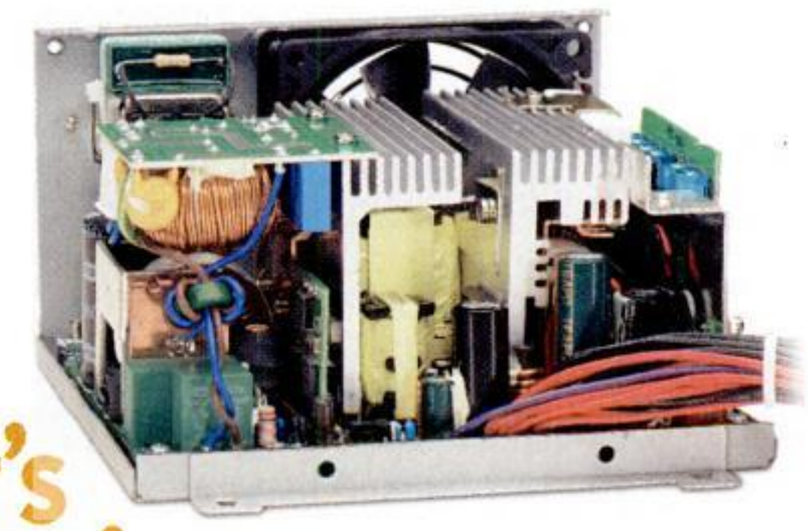

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Apple 30GB iPod MP3 Player

MAXIMUM PC KICK ASS PRODUCT

Could it be the Gear of *Two* Years?

When it comes to MP3 players, there's the iPod, and then there's everything else. It's kind of amusing to see other companies struggle to imitate the original iPod's ease of use and graceful design. So far, the only company that's succeeded in this effort has been Apple itself, with its third-generation, 30GB iPod.

The differences between this model and its predecessors could be likened to the differences between a beautiful suit that fits off the rack and one that's been tailor made—the changes are subtle, but deeply satisfying. Navigation duties (play, forward, reverse, and menu) have been moved from the ring around the scroll wheel on the original iPod to four touch-sensitive, backlit buttons above the wheel. Sharp edges have been banished from the exterior, and the entire unit weighs in at a mere 5.6 ounces.

The new iPod sports a multi-use proprietary connector at the bottom of the player and a dock that connects to a FireWire port. You can also purchase the optional USB 2.0 adapter ($20) if that suits your fancy. As with previous models, the iPod charges through the port its connected to—even while you're downloading or listening to music. There's also a jack at the top of the player for the included remote, and a line-out jack for connecting to external speakers.

Every function and every feature works *exactly* as you would expect it to. You can even create playlists on the fly by highlighting songs and pressing the center button for a couple seconds.

Criticisms of the new design are hard to come by. We suppose it would've been cool if the navigation buttons were pressure-sensitive, so you could control the speed of scrolling or fast-forwarding by the degree to which you pressed the button. The bundled MusicMatch *Jukebox Plus 7.5* software is nowhere near as easy to use as Apple's own *iTunes*. And, of course, the iPod is extremely expensive.

The iPod reclines at a comfortable reading angle in its new habitat.

But the 30GB iPod represents the very best of what Apple strives for as a company: the idea that technology should not only be easy to use, but a pleasure as well. We think the new iPod is worth every cent.

—LOGAN DECKER

MAXIMUMPC VERDICT 10

+ APPLE JUICE
The very, very best MP3 player we've ever used. If only all our *music* was this good.

– CLAMATO
High-priced and the bundled MusicMatch *Jukebox* restricts MP3 recording to 128kbps.

$500, www.apple.com

LaCie 20GB FireWire/USB 2.0 Data Bank

Is this the geek equivalent to wearing gold chains?

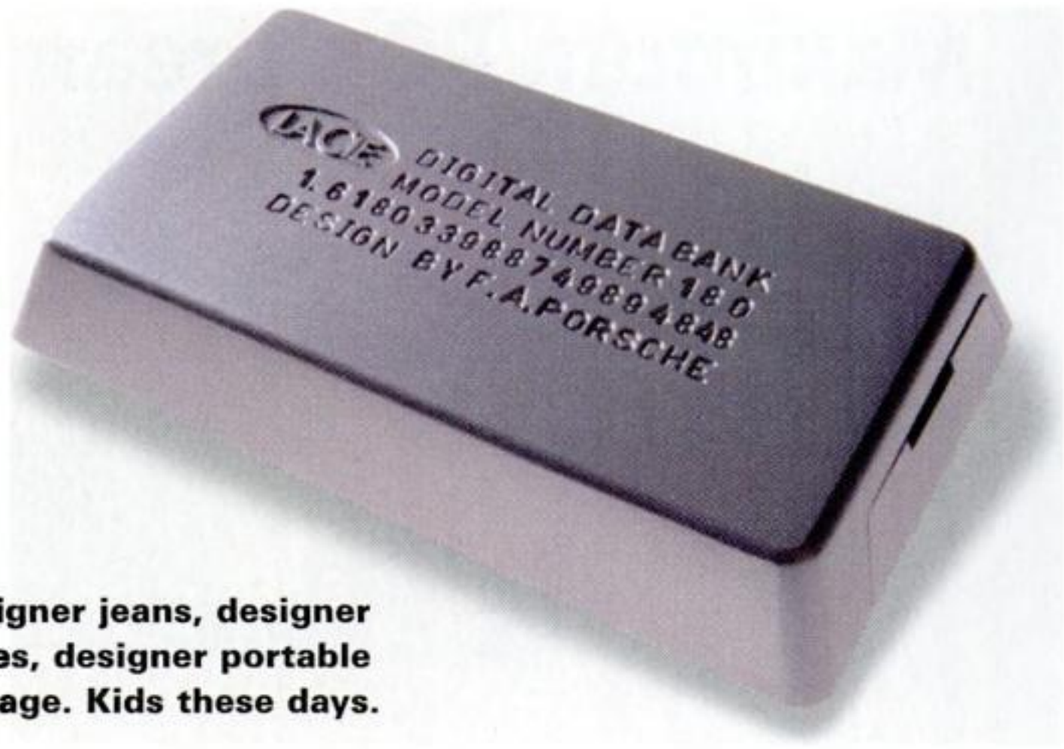
LaCie's 20GB portable hard drive was designed by F.A. Porsche, but, clearly, it doesn't represent Porsche's finest hour. Although appealingly small, the Data Bank (we haven't heard that term since the first *Star Trek* series) looks somewhat tacky after the first glance. It's designed to look like a silver ingot—*oooh!*—but has sharp bottom edges that are uncomfortable to hold, and is imprinted with unhelpful information: "Design by F.A. Porsche." You'd have to be really, well, *something*, to get off on touches like this.

We've seen smaller 20GB hard drives (such as SmartDisk's FireFly series, **www.smartdisk.com**), but not one with both USB 2.0 and FireWire connections. That's where the Data Bank shows some value; it has a mini USB connector and a full-size, six-pin FireWire port. Both connectors are concealed on the drive's side beneath a latch that feels flimsy but is actually quite tough and flexible. You'd have to be pretty abusive to break it off.

LaCie certainly hasn't broken any new ground in tiny-storage-device performance. It took us 48:12 (min:sec) to fill the entire 20GB capacity, suggesting a mere 4200rpm drive inside. Ho hum.

LaCie's diminutive drive starts looking downright silly when you consider that a smaller, 60GB FireFly drive can be had for *less* money (although you have to choose either FireWire or USB 2.0 models). As can a Nomad Jukebox Zen, for that matter. The Zen is another 20GB product with an equally goofy name, but it'll also play your MP3s. We don't see any reason to spend this much money on a product that appears to have been designed during someone's lunch hour.

—LOGAN DECKER



Designer jeans, designer shoes, designer portable storage. Kids these days.

MAXIMUMPC VERDICT 6

+ BAGEL
It's the smallest drive we've ever seen that sports both USB 2.0 and FireWire connections.

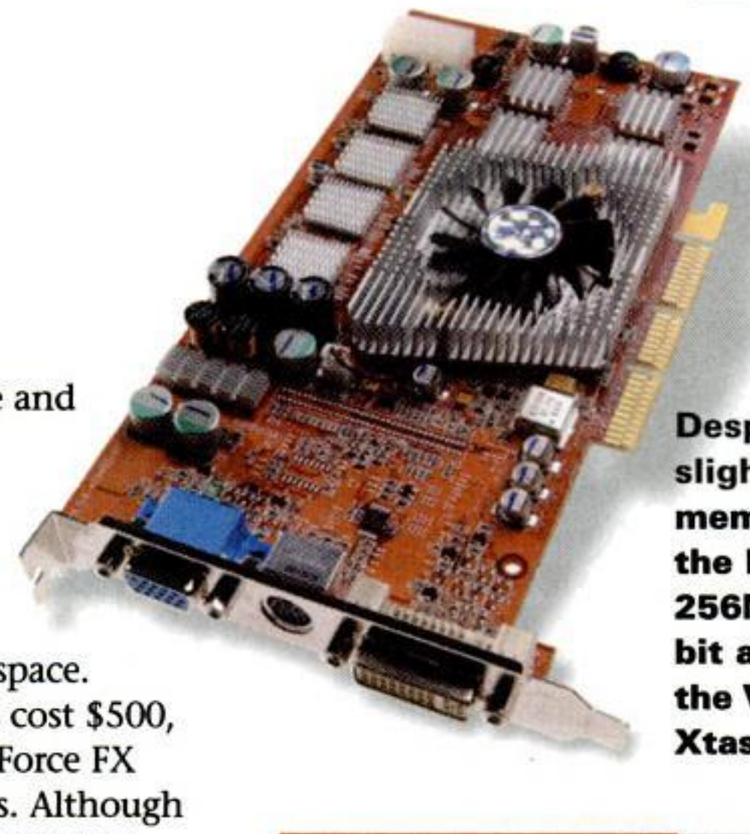
– NAGEL
The initially startling design gets tiresome almost immediately. The internal drive is slow.

$300, www.lacie.com

Copyrighted material

Radeon Rhapsody

FIC and Visiontek duke it out with nearly identical 256MB boards

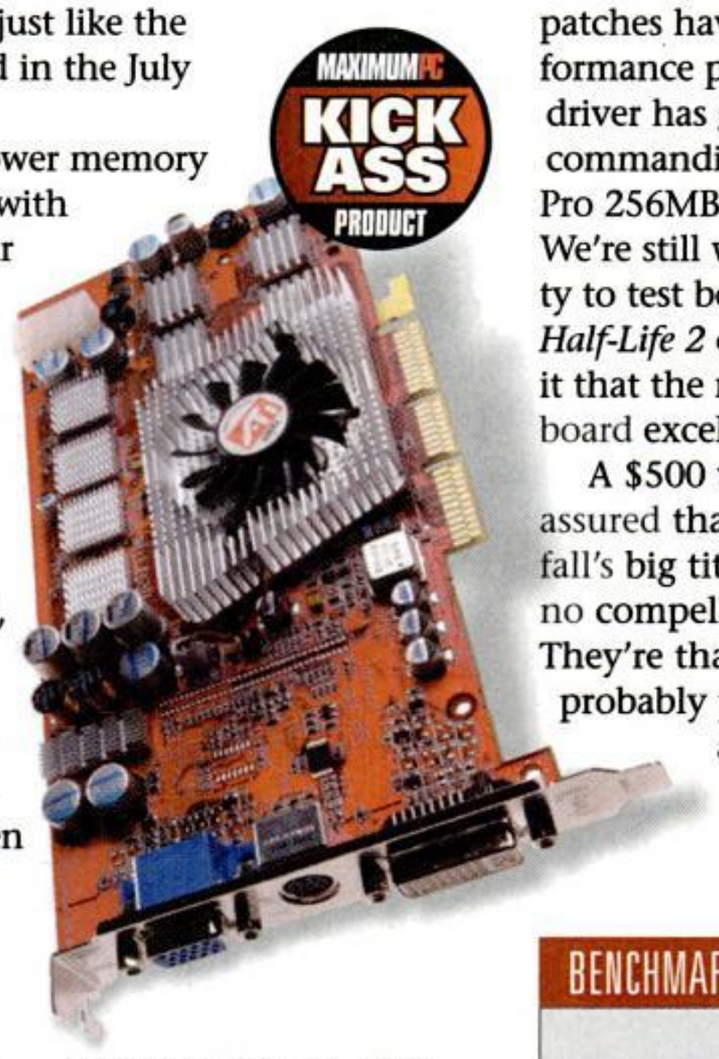


Despite a slightly lower memory clock, the FIC A98P 256MB is every bit as fast as the Visiontek Xtasy board.

Within days of each other, we received a pair of pretty ladies based on ATI's Radeon 9800 Pro 256MB reference design—a Visiontek Xtasy 9800 Pro 256MB and an FIC A98P 256MB. Both boards feature a whopping 256MB of DDR II SDRAM on a 256-bit pipeline, as well as an ATI R350 core running at 380MHz. However, the FIC board's memory is slightly slower than the Visiontek's. The Xtasy runs a memory clock of 350MHz, while the FIC's clock is just 340MHz.

Aside from this minor difference in clock speeds, the cards are virtually identical. Both have DVI and DB-15 connectors, S-video output options, and the default ATI heatsink/fan combo. Both vendors also include memory heatsinks, just like the stock ATI board we reviewed in the July 2003 issue.

Despite the FIC card's slower memory clock, it ran neck and neck with the Xtasy 9800 Pro in all our normal benchmarks. In fact, differences in benchmark results between the two boards were all within the margin of error. However, when we started overclocking, things got interesting. Using *Powerstrip*, we were able to get both cards' DDR-II memory to 400MHz without any problems (cheers to the individual memory sinks). But when we began increasing core clocks, the Visiontek board pulled away from the FIC. We were able to get the Xtasy's GPU to an astounding 432MHz, but the FIC could manage just a meek 409MHz. Of course, overclockability varies from board to board, even among boards from the same manufacturer. In this case, the FIC was able to overcome its memory clock handicap, but this might not be the case with all boards.



It's not déjà vu—the Visiontek Xtasy 9800 Pro 256MB is virtually identical to the ATI Radeon 9800 Pro 256MB.

MAXIMUMPC VERDICT 9

+ A BOX OF ROCKS

A faster memory clock and a more OC-friendly core give the Xtasy 9800 Pro a Kick Ass award.

– A SACK OF HAMMERS

Even with the latest ATI driver update, the 9800 Pro is still slower than the GeForce FX 5900 Ultra.

$500, www.visiontek.com

The question you're probably asking is, Why the hell do I need 256MB of RAM on my videocard? The answer is simple: *Doom3* and *Half-Life 2*. While a couple of the benchmarks in *3DMark 2003* will fill the frame buffer of a 128MB card, the intense, realistic graphics that next-gen PC games crank out will demand a *huge* buffer for maximum performance and visual quality. And as games become more and more programmable, videocards will demand even more super-fast frame buffer space.

Both of these boards cost $500, and are slower than GeForce FX 5900 Ultra-based boards. Although the FX boards' performance has wavered over the last few months (driver updates and *3DMark 2003* patches have affected the FX performance profile), the latest nVidia driver has given the FX 5900 Ultra a commanding lead over the ATI 9800 Pro 256MB in almost all benchmarks. We're still waiting for the opportunity to test both 3D accelerators with *Half-Life 2* or *Doom3*, but rumor has it that the nVidia board runs *Doom3* faster, while the ATI board excels in *Half-Life 2*.

A $500 videocard is a big purchase, but you can rest assured that either of these boards is equipped for this fall's big titles. Unless you plan on overclocking, there's no compelling reason to choose one over the other. They're that similar. The overclocking contingent will probably prefer the Visiontek board. In fact, we were actually able to clock ours higher than the reference 9800 Pro 256MB that we received from ATI.

—WILL SMITH

MAXIMUMPC VERDICT 9

+ POST-IT NOTES

Despite a 10MHz slower memory clock, this board manages to perform in the benchmark department.

– HOPE FLOATS

The R350 core that powers this board just doesn't have the legs to compete with the FX 5900 Ultra.

$500, www.fica.com

BENCHMARKS	FIC A98P 256MB		Visiontek Xtasy 9800 Pro	
	noAA/no aniso	4xAA/8x aniso	noAA/ no aniso	4xAA/8x aniso
3DMark 03 Overall	5671	2912	5653	2909
3DMark 03 Game 2	38.1	14.3	37.9	14.2
3DMark 03 Game 4	33.3	24.4	33.3	24.4
UT2003 Flyby	131	78.2	135	78.2
UT2003 Botmatch	71	48.4	71.3	48.4
Splinter Cell	41.4	N/A	41.4	N/A
Quake 3	146.1	84.7	145.5	84.8

All tests were run using the Catalyst 3.5 drivers on our Pentium 4 3.0GHz test bed, with 512MB of RAM. Splinter Cell doesn't run properly with antialiasing enabled, so we do not report AA results for that benchmark. A group of hippopotamuses is called a bloat.

Where'd AA Scores for Splinter Cell Go?

As we were evaluating both new and old benchmarks, searching for the perfect videocard test to update our benchmarking suite, we noticed that something was amiss with *Splinter Cell*. Regardless of the antialiasing settings we chose in the control panel, a bug in *Splinter Cell* disables AA in the game—and in our benchmarking runs. Because *Splinter Cell* is one of the few available benchmarks that use programmable shaders, we're going to keep running it. We'll just report the score in our low-quality mode (no antialiasing and no anisotropic filtering) and not the high-quality results.

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Lian-Li PC-6070A Silent Case

Nice enclosure—if you're into the 'strong, silent type'

Lian-Li. To hardcore system builders, the name stands for utilitarian design, strong build quality, and fair pricing. But now we can add "noise control" to Lian-Li's list of attributes, care of the PC-6070A. This aluminum case features the familiar layout of most Lian-Li mini-towers (four front-mounted 5.25-inch bays, three front-mounted 3.5-inch bays, and five internal 3.5-inch bays), but also uses various sound-deadening strategies to help hush the mechanical hornets' nests that typically plague high-performance PCs.

The interior of each side panel is outfitted with noise-absorbing foam, and the front aluminum door sports soft rubber seals to help shut up any whining optical drives. Also, the case's three 80mm fans operate at very low rotational speeds—so low, they're essentially silent. We couldn't hear them from half an inch away. This case is indeed library-quiet.

The PC-6070A's interior is well laid out, devoid of sharp edges, and roomy (for a mini-tower). Two USB connectors adorn the lower front fascia. The removable internal drive cage can be configured to hold either five 3.5-inch drives vertically, or three horizontally. The mobo tray, which slides out easily from the rear to facilitate upgrading, is no-nonsense sturdy. The front door is finely finished and opens smoothly. In fact, everything about the case screams "no-excuses build quality." Some of the *Maximum PC* editors sat on it and rocked around a bit, and we heard nary a squeak.

But nothing is perfect. In its quest for silent operation, Lian-Li went with three case fans that move relatively little air. In other words, this enclosure is far from ideal for overclocking. Also, at $200 the case doesn't jibe with Lian-Li's low-pricing tradition (and, yes, we're taking into account the high price of aluminum). If nothing else, the PC-6070A proves that you really can make a silent PC from a Lian-Li case—unless, of course, you have a Geforce FX 5800 Ultra videocard. Nothing can tame the roar of that beast.

— DWIGHT LOOI

MAXIMUMPC VERDICT 8

+ SILENT NIGHT

Well-designed layout, great build quality, inaudible case fans.

– SIREN NIGHT

Not much airflow from case fans. Pricey.

$200, www.lianli.com

Outfitted with sound-deadening material and low-rotational fans, the handsome Lian-Li case gets seen but not heard.

Xoxide UV Reactive Case

Thar she glows!

For every strong, silent type who wants the quiet confidence of a Lian-Li case, there's some wild-and-crazy party boy who's looking for something totally sick-looking (and if you're a wild-and-crazy party boy, you already know that a "sick-looking" case is a *good* thing). So how about an enclosure that bares all your PC's innards and glows in the dark? If this sounds like your kind of cocktail, Xoxide happens to be serving it up.

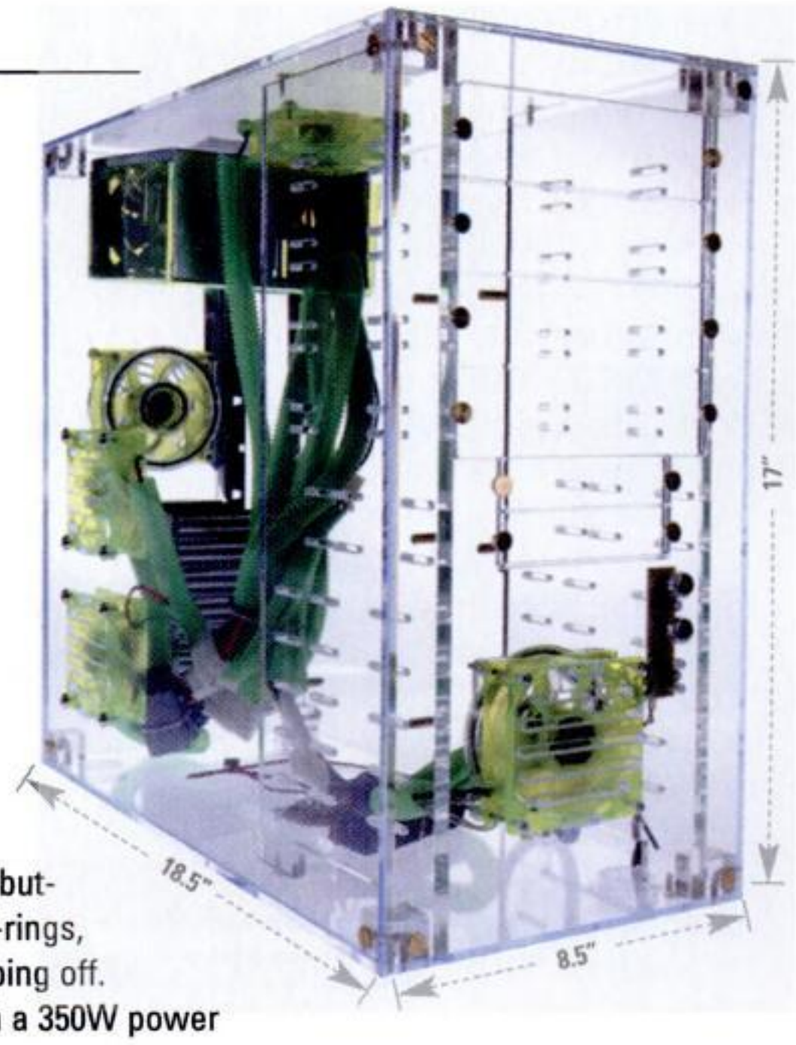
The so-called "UV reactive" case is an all-acrylic design made from clear panels that respond to ultraviolet light with an eerie glow—greenish or bluish depending on the version you buy. Trust us: It works. The case looks clear until you turn on your internal UV lights, at which point it glows quite conspicuously. The kit eschews a metallic mobo tray, so you can be assured that any standard ATX board you stuff inside will be stark naked. The aesthetics of the green tubing? Well, that's a personal call, isn't it?

There are four 5.25-inch and two 3.5-inch front-access bays, plus another five internal 3.5-inch bays—no shortage of drive space here. Five 80mm fan mounts ensure thorough ventilation, and Xoxide will sell you fans equipped with UV cathodes or UV LEDs, as well as various stand-alone UV cathode tubes, to augment your case's radioactive appearance. The case comes disassembled, and, yes, it's a pain to put together.

The enclosure earns our highest geekolades for its coolness factor, and there's ample internal room for upgrade maneuvers. Just don't expect the same kind of rigidity you'd get with a steel or aluminum case. Acrylic is acrylic, so you'd never dare sit on this bad boy—the material would certainly crack at the joints where the panels are held together by brass screws and traction studs. Also, the front drive-bay covers, which are held in place with brass buttons fitted with rubber o-rings, were in the habit of popping off. Finally, our kit came with a 350W power supply, and the screws that hold the PSU in place weren't strong enough to prevent the power assembly from sagging.

The enclosure looks badass, but we wouldn't be surprised if its fragility gives it an extremely short half-life.

— DWIGHT LOOI



Imagine seeing all your PC's components bathed in colorful light.

MAXIMUMPC VERDICT 6

+ THE INCREDIBLE HULK

Cool UV-reactive clear acrylics, ample drive bays and fan mounts.

– THE INCREDIBLE SLOP

Fragile as a little buttercup—our review unit was cracked on arrival.

$130, www.oxide.com

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- Creative Labs Sound Blaster Audigy
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- NVIDIA GeForce FX 5900, 256MB Graphics
- Creative Labs Sound Blaster Audigy
- 16x DVD-Rom
- 52x CDRW
- Logitech Cordless MX Duo Elite Keyboard, MX700 Optical Mouse

Price: $1599.00

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Digital Persona U.are.U Pro Workstation

Give your PC the finger!

MAXIMUM PC KICK ASS PRODUCT

Lock everyone but yourself out of your PC using the U.are.U Pro biometric fingerprint scanner.

When we reviewed the Personal edition of the U.are.U fingerprint recognition kit for WinXP last February, we had just one serious complaint about the security system: It didn't let you do one-touch logins unless you enabled Fast-User switching in Windows. Because of this flaw, any user who wanted the extra security of a traditional login, or anyone who wanted to automatically log in to a small fileserver, was out of luck. Well, the Pro version of the kit solves the problem by including a slightly different software bundle.

With its added WinXP login abilities, and all the bells and whistles that graced the initial edition, the U.are.U Pro is the best biometric device we've tested to date. Worried about snoops getting into your "special" applications? It's easy to require a fingerprint to access specific files and applications. Tired of typing passwords into every bloody web page on the net, but concerned about the security of your browser's built-in password utility? U.are.U can save your passwords. When you browse to a password protected web site, all you need to do is touch the finger sensor to sign in to the site.

The biggest difference between Digital Persona's fingerprint recognition system and that of other biometric devices we've tested is that the Digital Persona scheme actually works. The sensor is very forgiving; you don't have to line up your finger perfectly, or have it in exactly the same position every time. You can also register all 10 fingers, so you don't have to remember which finger is registered, or worry if one of your digits is indisposed. Best of all, you're free from the futzing around that's generally required by voice and face recognition systems. You don't have to remember a passphrase, a particular facial expression, or anything else. All you need is a finger attached to your body, and you're in.

The other thing that separates the U.are.U from most other biometric devices is that you're not totally boned if the hardware breaks or the software stops working. Should the unthinkable happen, you'll still be able to log in to Windows—and everything else—using your normal password. Now that's a thought that makes us feel secure.

—WILL SMITH

MAXIMUM PC VERDICT 9

+ FORT KNOX
The U.are.U Pro has everything we want in a biometric security device.

– A STRAW HOUSE
Unless you're really, really concerned about data security, $150 is a lot for most users to spend.

$150, www.digitalpersona.com

Logicube Solitaire Turbo

Wham, bam, it's a cloned drive, man!

Slip a hard drive into this device, connect the device to your PC, press a couple buttons, and let the drive-cloning begin. It's that easy.

With a focus on people who take their hard drive cloning *very* seriously—IT professionals, law enforcement officials, and data forensic analysts (the folks who handle subpoenaed evidence)—Solitaire Turbo is a stand-alone disk-copying device that gets the job done. It makes easy clones of hard drives by hooking directly to a PC via its IDE bus, parallel port, or USB 2.0 port (via a USB adapter), and it runs like the dickens.

The expensive kit comes in a fancy satchel, and includes the Solitaire Turbo itself, as well as all the necessary cables for data throughput and power. The Turbo unit is home to both the drive you want to copy (it installs without trouble) and all the embedded software that manages the copying process.

Cloning a drive is nearly foolproof. It's simply a matter of connecting the Turbo to your PC, and pressing the big green Start/Stop button on the front of the unit to choose the copy direction. Press the green button once again, and the cloning begins. The unit lacks confirmation dialogs, so be extra careful. Very few yes/no questions will prevent you from accidentally overwriting the data that you're trying to back up.

Using an IDE connection, we were able to copy an NTFS-formatted drive with a full Windows installation in less than five minutes—pretty damn quick for about 6GB of data. For this particular cloning job, Turbo reported a transfer rate of around 1.73GB per minute.

An additional utility, *OmniDiagnose*, is included on the unit but kept off limits until you pony up an additional $150. This software increases Solitaire's functionality by allowing you to perform diagnostics on the master drive. You can find and repair bad sectors, recover data from sectors that are damaged but still readable, and erase a hard drive to Department of Defense specifications. All these added tools are attractive, but charging that much extra for pre-installed software is uncouth.

This one-note Johnny charges a pretty penny for being the best at what it does, so you'd better be planning to clone a whole bunch of hard drives.

—ROBERT PALMER MOSELEY

MAXIMUM PC VERDICT 8

+ TURBO REGALS
Compact and powerful, gets the job done with little fuss, easy to use.

– TURBO LAG
Limited utility for a high price. Additional functionality is expensive.

$1,200 (USB adapter costs an extra $300; OmniDiagnose an extra $150)
www.logicube.com

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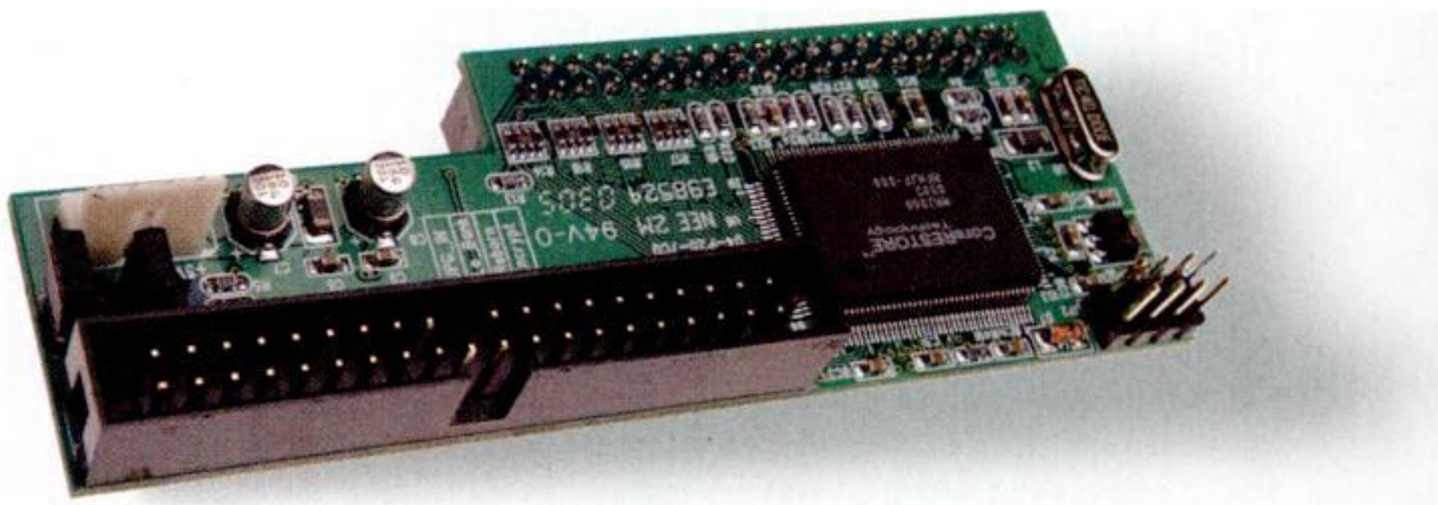
CorePROTECT CoreRESTORE

It's a heck of a lot easier than turning back time



Who'd've thunk such a wee PCB could save us from hard drive mayhem.

We've all had that "Oh no! What have I done?" moment. You didn't update your antivirus software, and some germ attacked your hard drive. Or you "accidentally deleted" the entire contents of your Windows directory. Or you ran *FDISK* on some partition you really shouldn't have messed with. In short, you need some immediate hard drive therapy. That's the promise of CoreRESTORE—assuming it's installed on your PC *before* the mishap occurs.

The product is a small board that needs to be placed between your hard drive and the master connector of your primary IDE channel. The user documentation is completely inadequate, but once we figured out CoreRESTORE's modus operandi, installation proved straightforward. You essentially insert the device in your IDE chain, format your hard drive, and install your OS to create a base state for the volume.

The product creates two separate environments on the drive: an accessible software environment (your C: drive), and a hidden section that tracks all changes to the data on your accessible drive. Once installation is complete, CoreRESTORE operates in one of three modes: install mode (in which everything you write to C: is actually written to C:); live disk mode (that keeps track of changes until you either choose to discard them or save them); and RAM disk mode (in which all changes to your data are discarded automatically when the machine is restarted).

The system very effectively protects data. During testing, we not only deleted system files and restored them successfully, we also used PowerQuest's *Partition Magic* to delete the partition information for our drive, and then ran what was left through a secure deletion. We then used CoreRESTORE to restore the drive, and it was promptly returned to its original state.

CoreRESTORE does have some problems, though. Because of the space required to store data changes, the useable size of your hard drive is reduced by half. Disk speed also takes a hit. We recorded drops of about 20 percent in *HDTach's* random access tests. Nonetheless, if you find yourself frequently looking backward—uninstalling software, removing the detritus of web surfing, fixing your children's tomfoolery—this product could be a godsend. Software utilities and WinXP's own restore function can't track and restore everything, but CoreRESTORE can.

—ROBERT PALMER MOSELEY

MAXIMUMPC VERDICT 7

+ CORE COMPETENCY

Exceeds the protection level of software-based solutions.

– CORE MELTDOWNS

Consumes half a drive, and lowers overall drive speed.

$150, www.coreprotect.com

dtSearch Desktop

But can this super search tool parse through the Matrix?

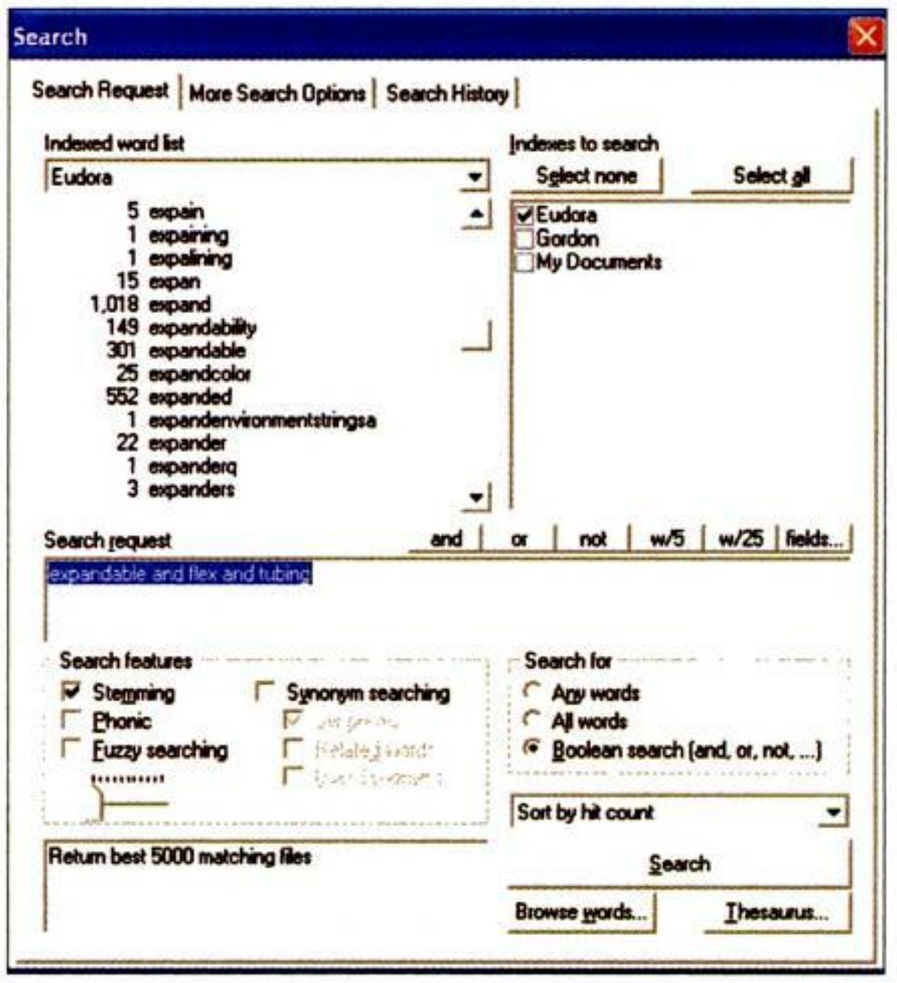
Lawyers, medical researchers, private eyes, and even the *Maximum PC* Watchdog know what a royal hassle it can be to find a single word or phrase amid 40 gigabytes of data. Which *Word* file is it hiding in? Is it even located in a *Word* file at all? Enter *dtSearch Desktop*, which can find a haystacked needle in just a few seconds.

To work its magic, the program creates massive indexes of your hard drive's data—*every* piece of data in *every* file, if you so desire. Once the index is created, you can sift through it with an amazing array of search options. Sure, you can use the same Boolean queries you might type into Google.com, but you can also run phonic searches, which parse data according to how a word sounds, and "stemming" searches, which look for grammatically similar words and synonyms.

Running a query is easy, but the program's setup is painful if you have gigabytes of data. On a desktop machine loaded with mail, PDFs, text files, HTML code, and web site archives (among other documents), *dtSearch Desktop* needed an overnight stint to index the 50GB of data. The program also balked at indexing the entire contents of our drive (we had to create different indexes for searches of e-mail and My Documents), and we were annoyed by the default search template, which has *dtSearch* parsing through numerous ISO images, Palm PDB files, and EPS files—files that are unlikely to be hiding anything useful. Unless you exclude an extension during indexing, the program will try to index *everything*.

Does everyone need *dtSearch Desktop?* No. At $200, it will appeal only to people who absolutely must have its features. But if you do run the kind of business where its features are necessary, the program is pure gold.

—GORDON MAH UNG



Do a "stemming" search, and the software will look for grammatically similar words.

MAXIMUMPC VERDICT 8

+ TWIX

Will find a needle in a haystack.

– ALMOND JOY

Takes forever to index large amounts of data, and the interface looks dated.

$200, www.dtsearch.com

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Star Trek Elite Force II

Your mission: To destroy new life and hostile civilizations

"Hi! My name is Jeff, and I'll be your boss monster today."

The USS Dallas is adrift. No life signs. No artificial gravity. Little power. You beam into the cargo bay, and activate your night-vision to make your way through the darkness. A flickering console is barely visible beneath a collapsed catwalk. Using your tricorder, you access the console to reroute power around destroyed circuits. Once power is restored, the cargo bay doors glide open with a soft *whoosh*. In the dim light of the bay, amid the floating dust and debris that's whisked inside, you see the lifeless body of a crewman drifting weightlessly near the ceiling.

That's the grim beginning of the events in *Star Trek Elite Force II*, and what was "good" in *Elite Force* gets even better in this first-person shooter sequel.

Having disbanded after *Voyager* returned to the alpha quadrant, the Hazard Team is reunited by none other than Jean-Luc Picard of the Enterprise to investigate what happened to the USS Dallas. Discovering the fate of the starship will take you through space stations under siege, smoldering ruins infested with kamikaze insects, seedy mercenary hangouts, and Romulan bases. And whenever the pacifist approach fails—which is most of the time—that's your cue to open fire.

Star Trek fans will appreciate the wider access to the Enterprise and its facilities, as well as frequent nods to the series' memorable moments. Imagine donning magnetic boots and skipping across the hull of the Enterprise, picking off assailants. FPS fans, on the other hand, will find fewer dull moments and much longer gameplay than the original *Elite Force* offered. *Elite Force II* surprised us with some very scary sections, too! And once the story wraps, it's on to multiplayer (additional maps can be picked up by replaying the game and collecting little gold Enterprises).

With lights glowing beneath floor grates and weapons that leave brilliant, undulating streaks of color in their wake, *Elite Force II* is easy on the eyes. Although there's absolutely nothing groundbreaking or original about *Elite Force II*, you can still look forward to a cinematic game that interspersed intense, hysterical firefights with moments of sweaty, nerve-wracking suspense.

—LOGAN DECKER

MAXIMUM PC VERDICT 8

+ THE WRATH OF KHAN

Superior to the excellent original *Star Trek Voyager: Elite Force* (not to mention longer).

− THE WHINING OF WESLEY CRUSHER

Weapon design is uninspired. And where are the bump-mapping and shader effects?

$50, www.activision.com

Hulk

It won't make you angry

Hulk has an interesting visual style with clean lines, simple but bold colors, and a shading effect to give it a comic-book look.

If you come to the tie-in game for the new *Hulk* movie expecting *Deus Ex* in tattered pants, or perhaps *The Sims* with green people, you'll be sorely disappointed. That's because *Hulk* is a thin game that mostly features the Gamma-American anti-hero running through levels, breaking down walls, throwing things, and hitting people.

And, you know what? That's OK. Licensed games really do stand or fall based on a unique set of criteria. Even a mediocre game can be redeemed by the opportunity to play as a favorite character. Witness the recent *Godzilla: Destroy All Monsters Melee* on console: It's a fairly conventional fighting game made almost insanely enjoyable by the ability to fight as monsters from Toho movies. On the other end, there's *Enter the Matrix*, in which you're unable to play as any of the three lead characters.

Think of *Hulk* as a linear fighting game with lots of running and jumping. And what jumping! When Hulk leaps from rooftop to rooftop, the ground cracks beneath his feet and the camera jiggles. Without the right moves, this could've easily tipped into the flop zone. Fortunately Hulk can lay some serious smack down, with a standard punch attack, a hand-clap that produces a sonic boom to stun enemies, and a few combos. Much more satisfying is the wide array of objects he can break and wield as weapons. Hulk can even pick a person and go bowling for soldiers.

All of this brainlessness must have worried the designers, who were clearly beset by the Stealth Imps—those devious gremlins that visit designers while they sleep and whisper a command to "insert stealth levels." Nothing else can explain the stretches that have you sneaking through a level as the thoroughly uninteresting Dr. Banner, hiding from guards rather than knocking their blocks off. Who on Earth finds this entertaining? It's just filler: the Hamburger Helper of gaming. With these levels, the game takes maybe 10 hours, which is just about right. Any longer, and it would've overstayed its welcome.

—THOMAS L. MCDONALD

MAXIMUM PC VERDICT 7

+ KERMIT THE FROG

You get to run around as the Hulk and break things.

− MR. GREEN JEANS

Unoriginal, simplistic, and linear.

$50, www.hulkgames.com

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STATE OF MICHIGAN
IN THE CIRCUIT COURT FOR THE COUNTY OF WAYNE

IN RE: NEW COM INC) CASE NO. 98-838563 CP
)
) JUDGE JAMES J. RASHID
)

NEWCOM PRODUCTS

SUMMARY NOTICE OF CLASS ACTION SETTLEMENT

TO: ALL PERSONS WHO PURCHASED NEWCOM PRODUCTS WITH A PROMISE.REPRESENTATION, OR UNDERSTANDING THAT A REBATE WOULD BE PAID, AND WHO PROPERLY SUBMITTED THE NEWCOM REBATE DOCUMENTS ACCORDING TO THE TERMS OF THE REBATE AGREEMENT AND WHO DID NOT THEREAFTER RECEIVE THE REBATE FUNDS AS PROMISED.

YOU ARE HEREBY NOTIFIED, pursuant to Rule 3.501 et seq.of the Michigan Rules of Court and an Order of the Court dated November 19,2001, that a settlement on behalf of the Class (described above) has been proposed. A hearing will be held upon the Proposed Settlement before the Honorable James J. Rashid, Wayne County Circuit Court, State of Michigan in the Coleman A. Young Municipal Center, Courtroom 1111, Two Woodward Avenue, Detroit, Michigan 48226-3413 to determine whether the proposed settlement of the Class claims against Newcom, Inc., Aura Services, Inc., Steven Veen, Harry "Zvi" Kurtzman, Sultan Khan, Asif Khan, Deutsche Financial Services Corporation, Best Buy Co., Inc., Circuit City Stores, Inc., CompUSA and Staples, Inc. (the "Defendants") should be approved by the Court as fair, reasonable, and adequate.

Named Plaintiffs Kerry Morgan, Don Girard, Frederick Jorgensen, and Lamont Klecot, Jr.,have brought this suit on behalf of all similarly situated people,alleging claims against the Defendants for breach of contract,negligence,violation of the Michigan Consumers Protection Act,and/or various equitable theories.The Plaintiffs claim that the Defendants wrongfully failed and/or refused to pay rebates to persons who purchased Newcom products with a promise, representation, or understanding that a rebate would be paid, and who properly submitted the Newcom rebate documents according to the terms of the rebate agreement and who did not thereafter receive the rebate funds as promised. The Defendants deny that any of them have committed any violation of law or any wrongdoing or that the Defendants have any liability with respect to the Plaintiffs or on behalf of the Plaintiff Class, but have concluded that it is desirable that this action be settled. If the proposed Settlement is approved. Participating class members may be entitled to receive certificates for the reduction of the price of computer-related products.

IF YOU ARE A MEMBER OF THE CLASS DESCRIBED ABOVE, YOUR RIGHTS WILL BE AFFECTED AND YOU MAY BE ENTITLED TO PARTICIPATE IN THE SETTLEMENT. Any member of the class has the right to be excluded from the action by submitting to Plaintiffs' class counsel by October 26, 2003 a written election to be excluded. Any member of the class may intervene in the action.

You may receive additional information and the full printed Notice of Settlement of Class Action, which includes a more detailed description of the settlement, including information about scheduled hearing dates and your rights to participate in, opt out of, intervene, or object to the settlement, by contacting Plaintiffs' Class Counsel, Macuga & Liddle, P.C. by writing, calling or accessing the website:

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Detroit, MI 48243-0157
(313) 259-6347
www.rebatesettlement.com

In order to share in the settlement, you will be required to submit a Proof of Claim to the Settlement Administrator which must be received by October 26, 2003.A Proof of Claim may be obtained from the Settlement Administrator at the above address, phone number, or Internet site.

IF YOU ARE A CLASS MEMBER, AND THE SETTLEMENT IS APPROVED AT OR AFTER THE SETTLEMENT HEARING, YOU WILL BE BOUND BY THE FINAL ORDER AND JUDGMENT OF THE COURT UNLESS YOUR REQUEST FOR EXCLUSION IS RECEIVED BY THE SETTLEMENT ADMINISTRATOR BY OCTOBER 26,2003.

PLEASE DO NOT CONTACT THE COURT OR THE CLERK'S OFFICE FOR INFORMATION;
CONTACT ONLY PLAINTIFF CLASS COUNSEL AT THE ADDRESS CONTAINED IN THIS NOTICE.

DATED: July 11, 2003

BY ORDER OF THE COURT HON. JAMES J. RASHID

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Age of Wonders: Shadow Magic

It's a little bit turn-based, it's a little bit RPG

In every young wizard's life there comes a time when he must face a never-ending horde of hell spawn.

Turn-based strategy games just aren't as popular as they used to be. The genre has been decimated by more accessible real-time "McStrategy" games, and rightfully so. Turn-based games *deserve* their reputation as being slow and boring. Enter the *Age of Wonders* series, which upends the traditional turn-based formula by adding RPG elements and speeding up gameplay.

The *Shadow Magic* installment pits you, a powerful wizard, against other wizards and monsters in a battle that will decide the fate of your world. OK, there's nothing revolutionary in this story, but we nonetheless found it engrossing once we learned how to play the game. In addition to different campaigns, there's also an excellent random mission generator. The campaigns are short, but the missions are long.

Learning the ropes in a game as complex as *Shadow Magic* would be a nightmare if it weren't for the exhaustive in-game tutorials. The tutorials are vital to this game, because even the first mission is brutally difficult. There simply aren't any milk runs in *Shadow Magic*. The real fun comes when you actually fight an enemy army. Instead of rolling a digital D20 when armies meet in order to determine the winner, the game zooms in from a large 2D strategic map to a 3D tactical map of your immediate surroundings. By carefully maneuvering your forces, and using their magical powers wisely, you can vanquish a larger force.

Turn-based multiplayer games are generally tedious multi-day affairs played only by college students and others with too much free time. So, to eliminate the time spent on other players taking turns, *Shadow Magic* lets players take turns simultaneously. This makes it play almost as quickly as a real-time strategy game, but it's nowhere near as hectic. That said, *Shadow Magic* is still an extremely time-intensive game. Don't even start playing it unless you have time to burn.

—WILL SMITH

MAXIMUMPC VERDICT 9

GANDALF
An immersive campaign and an innovative blend of RPG and turn-based gameplay.

SARUMAN
Not for casual gamers. Our longest session lasted an ass-numbing seven hours.

$30, www.ageofwonders.com

Will Rock

Slaughter your way across Mount Olympus

If you want to kill an ancient Greek god, your best bet is a machine gun of some sort. Immortal? Bah!

It's hard not to like a game that blasts Twisted Sister's "I Wanna Rock!" every time you fire it up. Sure, it's a cheesy song, but it perfectly prepares you for *Will Rock's* full-on sensory assault.

Dig: *Will Rock* won't bore you with "minor details" like an in-depth story or nonlinear gameplay. There's no subtlety in this first-person shooter, folks. Your job is to send wave after wave of Zeus's mindless minions straight to hell. There are 15 basic enemy types, with a couple minor variations per species. Unfortunately, there are just two types of enemy attacks. You'll go up against "to hell with it, let's charge" enemies, as well as "stand back and shoot from a distance" enemies, but that's about it. The result is that by running backwards, shooting madly, and strafing a bit from side to side, you can completely avoid almost every attack in the game.

To relieve the tedium of mowing down endless enemy hordes, there's an occasional boss battle. The bosses use two basic attacks: a weak projectile weapon and an overpowered melee weapon. The one innovation in *Will Rock* is its power-up system. Scattered throughout the levels are altars that let you choose one "Titan Power"—immortality, extra damage, or slow motion. Once you've visited an altar and achieved the power, you can trigger it at any time. Without the Titan Powers, many of the boss battles would be impossible.

Will Rock uses the Sabre3D engine, a mediocre-looking 3D engine designed specifically for this game. There aren't a whole lot of fancy features in Sabre3D, but it can draw literally hundreds of enemies onscreen at any given time, with rudimentary shadows and bump-mapped surfaces. Despite this, *Will Rock* is a budget title that runs well on older systems.

This title certainly isn't "game of the year" material, but it does provide a few hours of mindless entertainment while you teach Zeus and his idiotic cronies who their daddy really is.

—WILL SMITH

MAXIMUMPC VERDICT 6

JOHN MCCLANE
Plenty of weapons and enough enemies make *Will Rock* entertaining for a few hours.

CASEY RYBACK
Intro tricked us into thinking this game had a story, but the plot was gone after 20 seconds.

$20, www.will-rock.com

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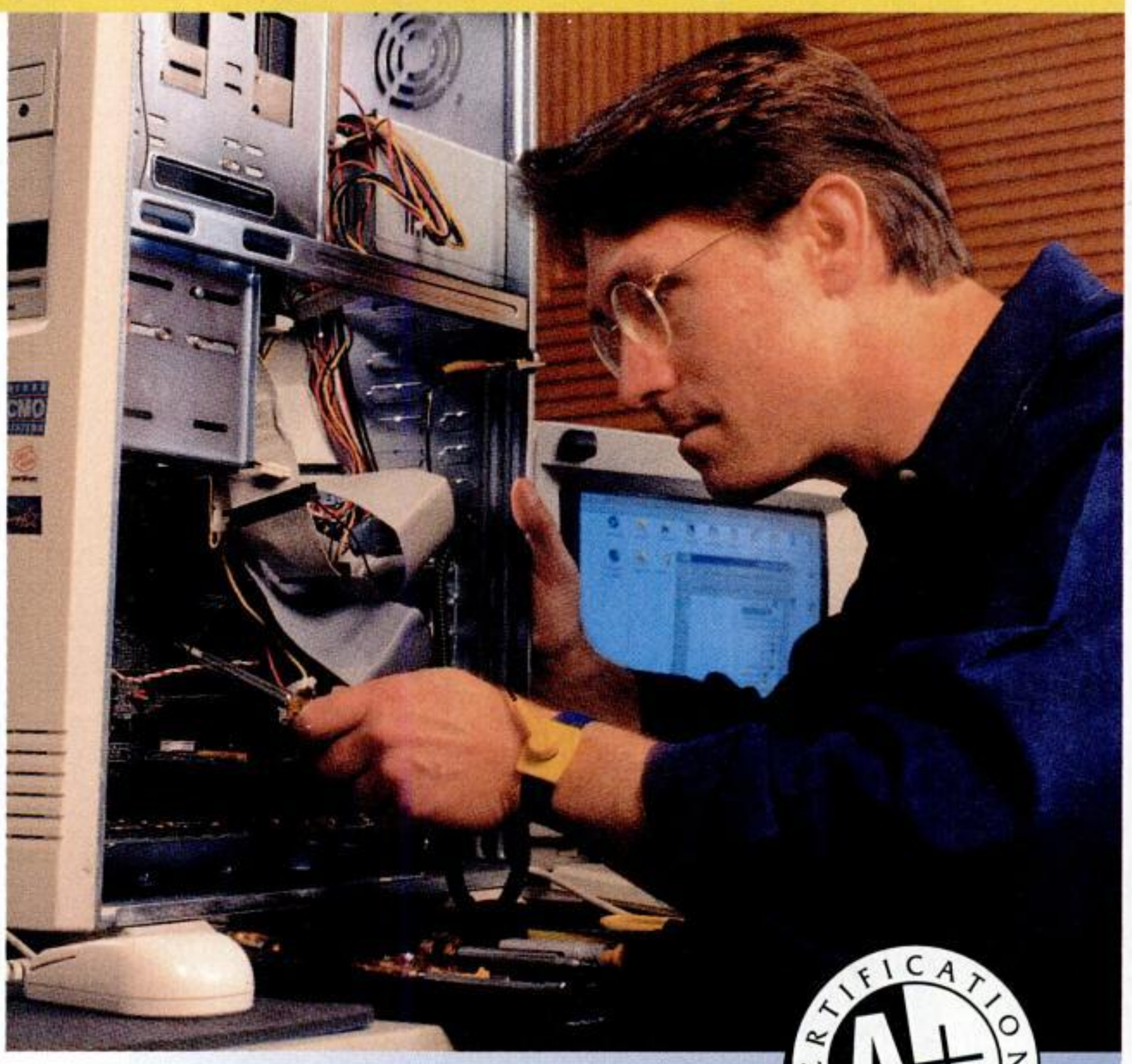

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Is it its slim monitor?
Is it its sleek speakers?

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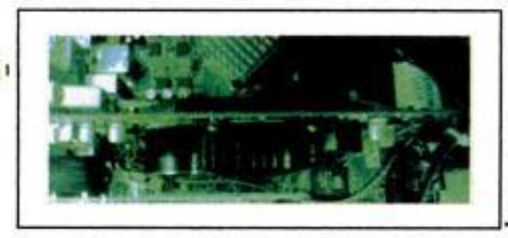

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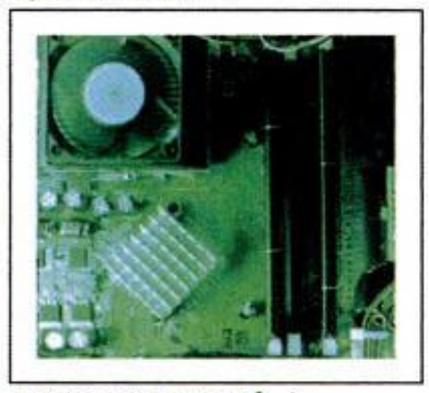

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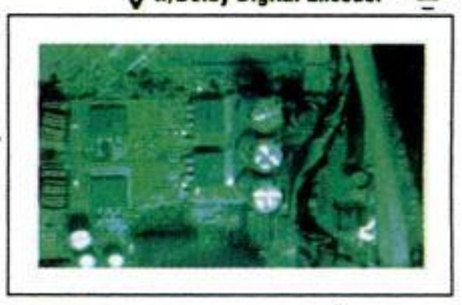

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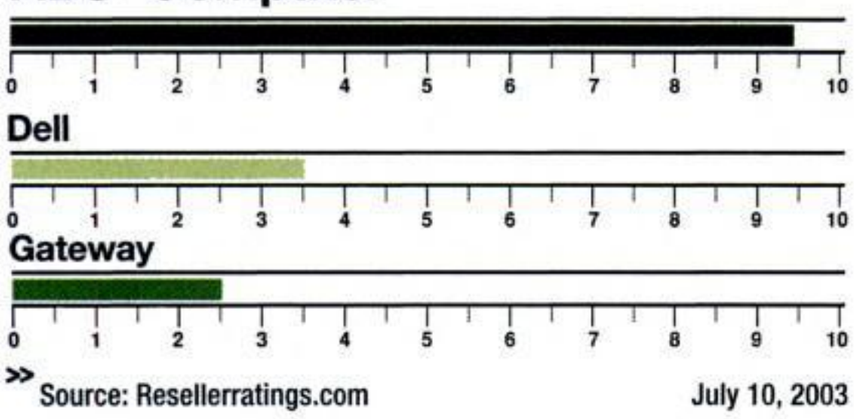

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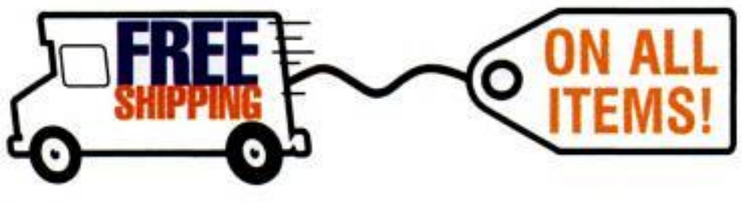

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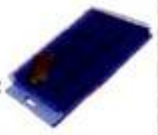

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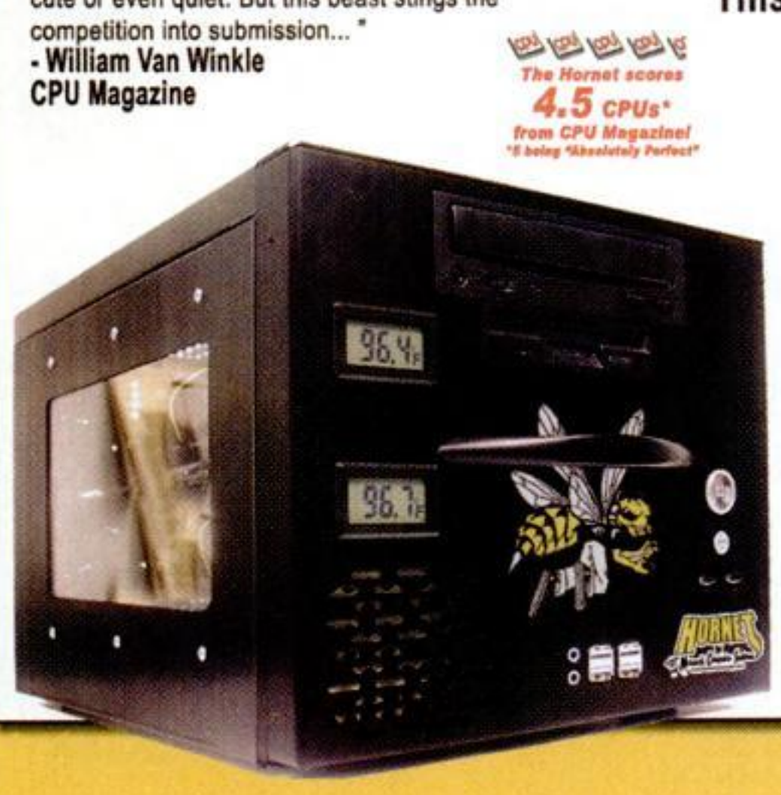

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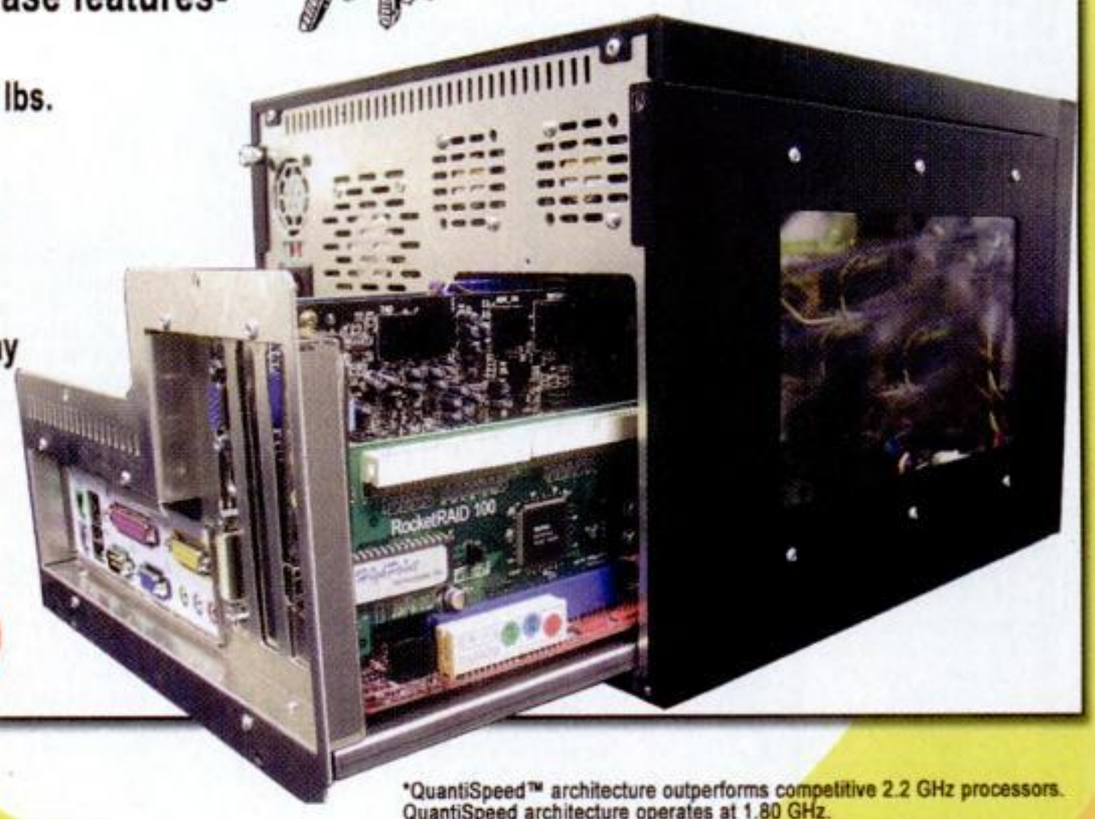

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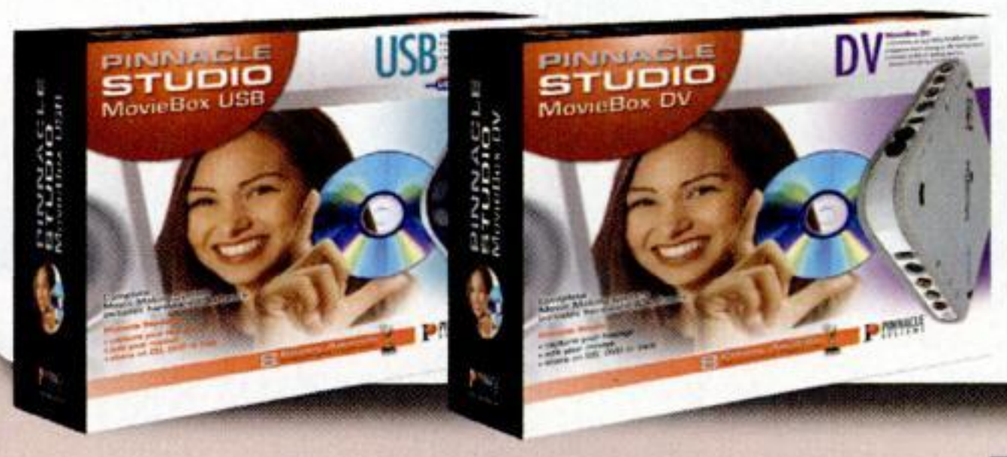

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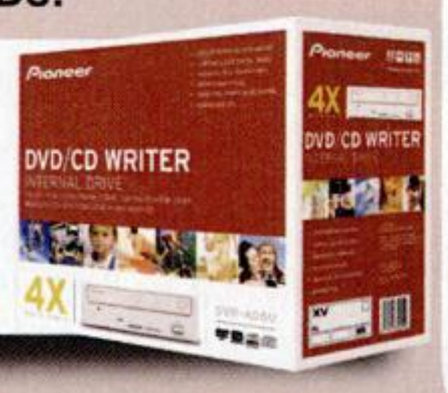

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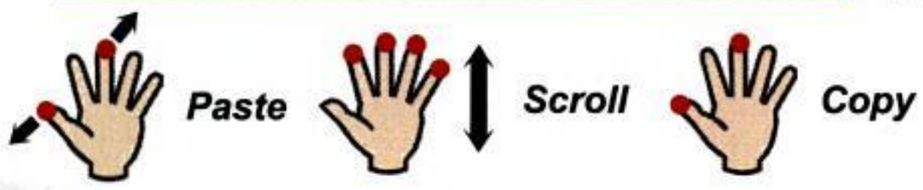
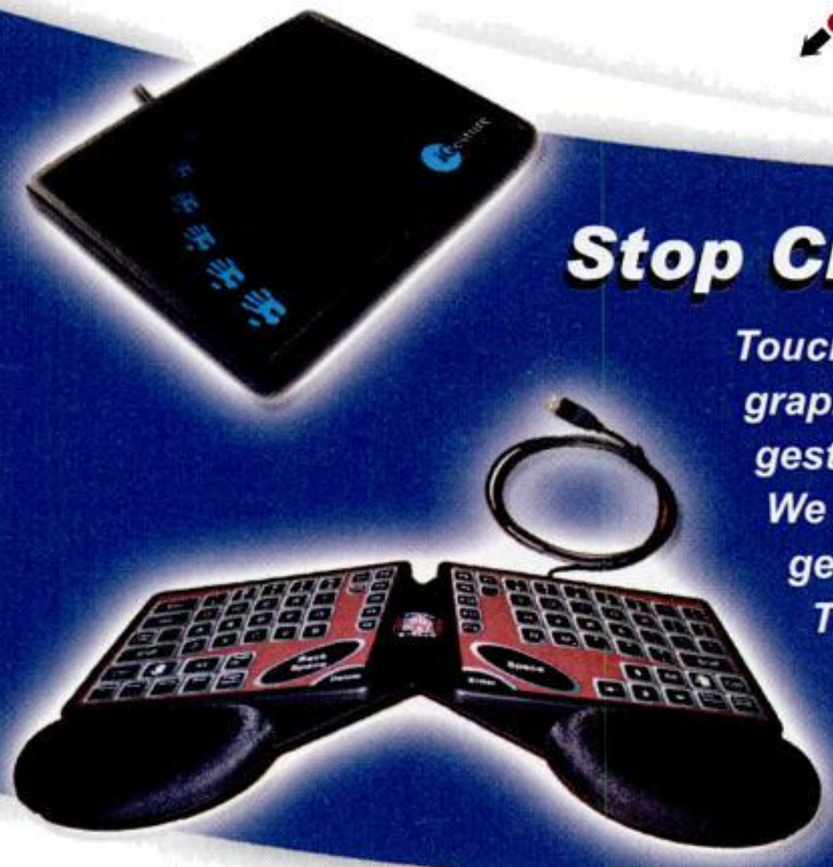
Cordless Elite Duo Mouse/Keyboard	$77
Cordless Navigator Duo Mouse/Keyboard	$64
MX 500 Optical MSE	$40
MX 700 Wireless Optical MSE	$65





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MAXIMUM PC KICK ASS PRODUCT
August '02
August '03

It's our absolute obsession with complete customer satisfaction and attention to detail. Our numerous Editor's Choice awards are a testament to our exceptional performance, craftsmanship, and value, but our 99.6% customer satisfaction rating is our proudest achievement. If you look at the company you want to build your next computer as much as you look at the components inside, you will discover the difference is clear, it's Velocity Micro!

Gamer's Edge™

- Intel® Pentium® 4 3.2GHz, 512k Cache, 800MHz
- Thermaltake™ CPU Heatsink & Cooling System
- DX Black & Silver Case - Full Tower with front USB 2.0
- Intel 875P Chipset Motherboard Dual Channel DDR
- 512MB Corsair® PC3200 DDR400 CL2 XMS
- 256MB nVidia® GeForceFX™ 5900 Ultra, 8x AGP
- 120GB 7200rpm ATA/100 Hard Drive, 8MB Cache
- Black 16x/48x Lite On® DVD-ROM
- Black 52x/24x/52x Lite On® CD-RW
- Black 1.44MB Floppy Drive
- SoundBlaster® Audigy2 w/ FireWire Port 6.1 Channel
- 10/100MBps Ethernet Network Adapter
- Black Microsoft® Multimedia Keyboard
- Silver Microsoft® Explorer Optical USB Scroll Mouse
- Microsoft® Windows® XP Home w/SP 1 and CD
- Custom Owner's binder w/complete documentation
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- Careful hand wiring w/ origami folded cables
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$2564

Pentium® 4 3.0 GHz	$2349
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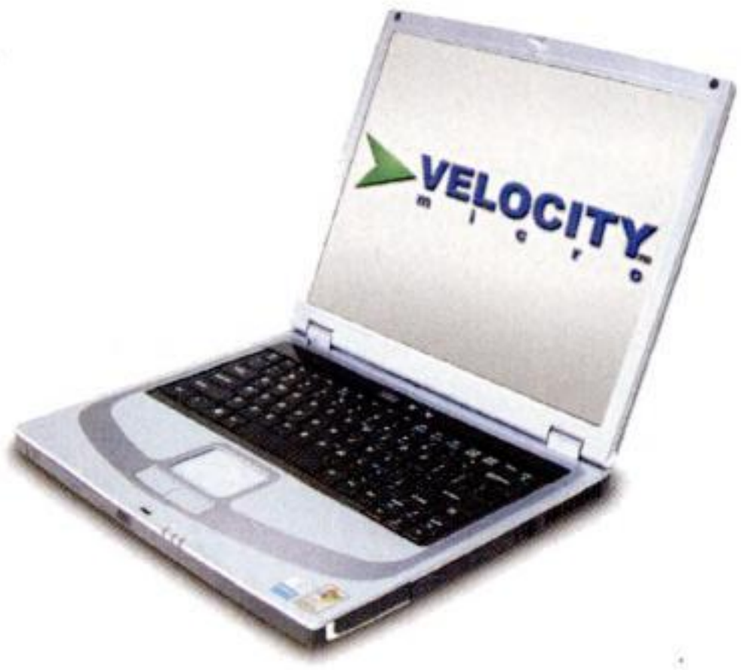
Vector™ VX

- Intel® Pentium® 4 2.53GHz, 512k Cache
- Intel® Certified High Performance Heatsink/Fan
- VX Blue Case - Full Tower with front USB 2.0
- MSI™ Neo2 Intel® 865PE Series Motherboard
- 512MB Kingston® PC3200 DDR400 memory
- 128MB ATI® Radeon™ 9600, 8x AGP Video
- 80GB 7200rpm ATA/100 Hard Drive, 8MB Cache
- Black 16x/48x Lite On® DVD-ROM
- Black 52x/24x/52x Lite On® CD-RW
- Black 1.44MB Floppy Drive
- Integrated 5.1 Channel Sound System
- Integrated 10/100 MBps Network Adapter
- Black Microsoft® Multimedia Keyboard
- Black Microsoft® Optical USB Scroll Mouse
- Microsoft® Windows® XP Home w/SP 1 and CD
- Personalized Custom System Restore Disks
- Custom Owner's binder w/complete documentation
- **1 Year Toll Free 24/7 Support & On-Site Service**
- Careful hand wiring and neatly folded cables

$1249

Pentium® 4 2.4 GHz	$1194
Celeron® 2.2 GHz	$1069



NoteMagix™ B50

- Intel® Pentium-M® 1.5GHz, 1MB Cache
- Premium Cooling System w/Arctic Silver III
- Intel® 855PM Motherboard with DDR, ICH4-M
- 15" SXGA+ TFT Active Matrix TFT Display
- 64MB ATI® Mobility Radeon 9000 AGP Video
- 512MB PC2700 DDR333 SODIMM Memory
- 40GB 5400rpm ATA/100 Hard Drive
- 8x DVD + 24x/10x/24x CD-RW Combo Drive
- Integrated 5.1 Channel Sound System
- Integrated 56K V.92 Modem
- Integrated 10/100MBps Network Adapter
- Integrated Intel® 802.11b WiFi Wireless Adaptor
- 3 USB 2.0 ports, Two 1394 IEEE FireWire
- 8-Cell Smart Li-Ion Battery, 58Wh
- Microsoft® Windows® XP Home w/SP1 and CD
- Personalized Custom System Restore Disks
- **1 Year Toll Free 24/7 Support & On-Site Service**
- Careful hand assembly and testing
- Individually Performance Tuned & Optimized

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Pentium®-M 1.7 GHz	$2445
Pentium®-M 1.4 GHz	$2035

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- 1.44MB Floppy Drive
- **NVIDIA® GeForce™ FX 5900 Ultra 256MB DDR AGP 8X** Video Card
- **NVIDIA® SoundStorm™** Audio with Dolby Digital® 5.1 Encoding
- **NVIDIA® 10/100 Ethernet LAN**
- Klipsch GMX D-5.1 Dolby Surround Sound Speakers
- 19" ViewSonic® Perfect Flat E90F+SB .21H mm Monitor
- Scrolling Internet Mouse
- Multimedia Keyboard
- Microsoft Windows® XP Professional Edition
- Free Norton AntiVirus™ 2003 CD
- Free 1-Year 24/7 ***i-Care*** Deluxe Technical Support + On-Site Service

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AMD Athlon™ XP Processor 3200+	$ 2149
AMD Athlon™ XP Processor 3000+	$ 1949
AMD Athlon™ XP Processor 2800+	$ 1859
AMD Athlon™ XP Processor 2700+	$ 1819

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- ~ Intel® Pentium® 4 Processor 2.4GHZ <800MHz Front Side Bus>
- ~ Intel® 865PE Chip Pentium® 4 DDR400 800MHz FSB 8x AGP Main Board w/USB 2.0
- ~ Raidmax® Scorpio-868 Mid-Tower Case with 350 Watt Power + See-Through Window + Sound-Activated Neon Light
- ~ 512MB Dual Channel **DDR400** PC3200 Memory
- ~ 80GB 7200RPM Ultra ATA-133 Hard Drive
- ~ 52x24x52 CD-RW Drive
- ~ 64MB NVIDIA® GeForce-4 MX440 8x AGP Video
- ~ 5.1 Channel Surround Sound & 480Watt PMPO Subwoofer Speakers
- ~ 10/100 Network LAN
- ~ 19" Viewsonic E90 .23H mm Monitor
- ~ Scrolling Internet Mouse & MultiMedia Keyboard
- ~ Microsoft® Windows® XP Home Edition
- ~ FREE Norton AntiVirus 2003 CD
- ~ FREE 1-Year 24/7 ***i-Care*** Deluxe Technical Support + On-Site Service

$ 879

Intel® Pentium® 4 Processor 3.2 GHZ <800MHz FSB>	$ 1379
Intel® Pentium® 4 Processor 3.0 GHZ <800MHz FSB>	$ 1179
Intel® Pentium® 4 Processor 2.8 GHZ <800MHz FSB>	$ 999
Intel® Pentium® 4 Processor 2.6 GHZ <800MHz FSB>	$ 899

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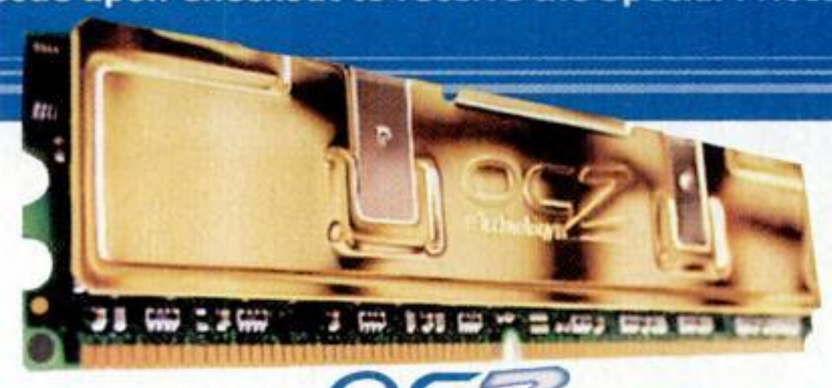

"Unholy Speed!" OCZ PC3700 466Mhz
CL 2.0 Dual Channel with Gold-plated Heatspreader

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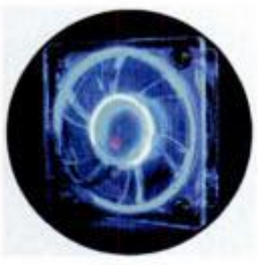
- Precise Optical Sensor!
- 5-Buttons!
- USB and PS/2 Compatible!
- Enter Coupon Code: xpcgearmpo

Sale price:$12.99



Dual CCFL Fans – Introductory Item!

- Unmatched Appearance!
- Two Rings of Light!
- Fan Included!
- Enter Coupon Code: xpcgearmcf

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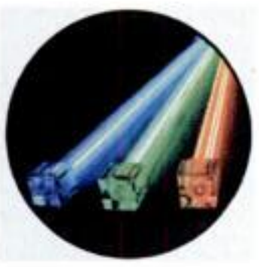
Logitech Cordless MX Duo - Black

- Cordless Elite Zero-Degree Tilt Keyboard!
- Cordless MX700 Optical Mouse!
- Award Winning Design!
- Eliminate Cord Clutter!



Vantec UV "Blacklight" Cold Cathode Kit

- Make your UV Sensitive Mods Glow!
- Dual-Inverter!
- PCI Bracket On/Off Switch!
- Enter Coupon Code: xpcgearmbc

Sale price:$7.49

Vantec Aeroflow – Socket A and 478

- Copper Core with T.M.D. Fan!
- Amazingly Low Cooling Temperatures!
- Best Performance-to-Noise Ratio Cooler!
- Enter Coupon Code: xpcgearmaf

Sale price:$19.99

EL Glow Round Cables

- EL Illuminated Round Cable!
- Silver Shielding!
- Various Colors and Sizes available!
- Perfect Mod for Clear Cases!

Creative Sound Blaster Audigy 2 Platinum with Drive Bay Panel

- Astonishing 24-bit/192kHz DVD Audio!
- Stunning Signal-to-Noise Ratio of 106dB!
- EAX Advanced HD and Dolby 6.1 Support!
- Enter Coupon Code: xpcgearmsa

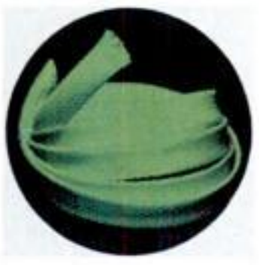
Sale price:$167

Wire Management - Cable Ties

- Perfect Solution to your Cable and Wire Mess!
- Keep Your Wires in Place!
- UV Sensitive Colors Add Style and Flare!
- Wide Selection Starting from $0.99!

Vantec Nexus 4 Channel Fan Speed Controller

- 3.5" or 5.25" Drive Bay Versions!
- Ultra-Bright Blue LED Lights!
- Supports up to 72 Watts!
- Must-have for Quiet Cases!



Wire Management - Wire Sleeving

- Perfect Solution to Your Cable and Wire Mess!
- Blue, Red, Green, Orange, Chrome and More!
- UV Sensitive Colors Add Style and Flare!
- Wide Selection Starting from $1.99!

Compact Flash Mini USB Card Reader

- Smallest, Simplest CF Memory Card Reader!
- Perfect Portable Removable Pocket Drive!
- Measures only 0.8" x 0.5" x 2.5" (WxHxL)
- Enter Coupon Code: xpcgearmcr

Sale price:$5.99

Wire Management - Heatshrink

- Easy-to-use Addition to Sleeving!
- Give your Case a Super-Clean Look!
- Seal the Ends of Sleeving!
- Wide Selection Starting from $2.99!

MP3-i 128MB USB MP3 Flash Memory Pen Drive Player

- Holds Approximately 30 MP3 Files!
- 8-hour Rechargeable Lithium-Ion Battery!
- Skip-Free, Continuous Playback!
- Enter Coupon Code: xpcgearmp3

Sale price:$79.99

xPCgear See-Through Clear Acrylic Cases

- Definitive Case Modder's Choice!
- Become a Showstopper with our All Clear Acrylic Case!
- Available with Black or Blue Backings and Blue UV!
- Enter Coupon Code: xpcgearmcc

Sale price:$68.99

Anodized Aluminum Thumbscrews

- Go Tool-Less!
- Beautiful Anodized Finish!
- Larger Head Provides Better Grip!
- Enter Coupon Code: xpcgearmts

Sale price:$0.99

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36.7GB 10,000RPM
Enterprise Serial ATA
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Price with purchase of case component

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Aluminum ATX Matrix Cases with out power supply. Great for building your killer gaming Machine

Ask your Sales Representative about all our Cool Case Mods!!

Xaser III Case w/ Window V1000D $165

Xaser III Case w/ Window V1000A $165

Xaser III Aluminum Case w/ Window V2000A $189

Special $145

Aluminum ATX Cases with 420watt P4 / AMD power supply, 4 80mm Multi Color LED Fans, and full side window.

Matrix 14Bay Full Tower ATX Case MA01GND-S $99

LianLi ATX Case W/Window Light Effect Front Panal PC 6010 $137

Cooler Master ATX Case Aluminum 10Bay ATC111 $190

Cooler Master ATX Case Aluminum 10Bay WAVEMASTER $175

Clear Acrylic ATX Case Fans Shown not included CLEARCASE $130

Motherboards Step 2

Asus	P4C800 Deluxe	$200	P4G8X Deluxe	$190
Gigabyte	GA-8KNXP	$245	GA-8IK1100	$164
	GA-8INXP	$200	GA8IG1000P	$141
Intel	D845PESV	$99	D865GBFLK	$145
	D845GVAD2	$91	D865PERLX	$124
AOpen	AX4CMAX	$209	AX4RPLUS	$179
	AX4GEMAX	$127	AX4SPEMAX	$162
Asus	A7N8X	$119	A7N8XDX	$135
	A7V8XGLFSR	$126	A7V8XLFWSR	$116
	A7V8XLAN	$94	A7V333AU2	$81
Gigabyte	GA7VKMP	$69	GA7VAXPULT	$128
	GA7ZXE	$59	GA7N400PRO	$128
AOpen	AK79DMAX	$117	AK79GMAX	$140
	AK778XMAX	$114	MK79GNk	$105

Processors Step 3

Celeron	2.3 GHz 128 cache	$92	P4	2.4GHz 512k 800	$202
Celeron	2.4 GHz 128 cache	$98	P4	2.53GHz 512k 533	$216
Celeron	2.5 GHz 128 cache	$103	P4	2.66GHz 512k 533	$219
Celeron	2.6 GHz 128 cache	$117	P4	2.6GHz 512k 800	$245
Xeon	2.4GHz 512 cache	$250	P4	2.8GHz 512k 533	$292
Xeon	2.66GHz 512 cache	$330	P4	2.8GHz 512k 800	$309
Xeon	2.8GHz 512 cache	$487	P4	3.0GHz 512k 533	$440
Xeon	3.0GHz 512 cache	$735	P4	3.0GHz 512k 800	$458
P4	2.4GHz 512k 533	$185	P4	3.2GHz 512k 800	$704
XP	2100+ Retail 266Mhz	$85	XP	3000+ Retail 333Mhz	$283
XP	2200+ Retail 266Mhz	$85	XP	3200+ Retail 400Mhz	$486
XP	2400+ Retail 266Mhz	$95	Opteron	240 1.4Ghz 64bit	$316
XP	2500+ Retail 333Mhz	$100	Opteron	242 1.6Ghz 64bit	$744
XP	2600+ Retail 333Mhz	$114	Opteron	244 1.8Ghz 64bit	$845
XP	2700+ Retail 333Mhz	$152			
XP	2800+ Retail 333Mhz	$198			

Check out our website for all the NEW AMD Opteron Motherboards

Memory Step 4

SDRAM

Branded	PC133	512MB	64x64 133MHz	$59

DDR Memory

Crucial	PC2100	128MB	DDR 266MHz	$28
Crucial	PC2100	256MB	DDR 266MHz	$45
Crucial	PC2100	512MB	DDR 266MHz	$77
Crucial	PC2700	128MB	DDR 333MHz	$31
Crucial	PC2700	256MB	DDR 333MHz	$47
Crucial	PC2700	512MB	DDR 333MHz	$79
Crucial	PC3200	256MB	DDR 400MHz	$57
Corsair	PC3200	512MB	DDR 400MHz	$97
Kingston	PC3500	256MB	Hyper X 434MHz	$91
Kingston	PC3500	512MB	Hyper X 434MHz	$165

HardDrives Step 5

Maxtor	80GB	7200rpm	ATA 133	6Y080L0	$92
Maxtor	120GB	7200rpm	ATA 133	6Y120L0	$110
Maxtor	160GB	7200rpm	ATA 133	6Y160P0	$180
Maxtor	200GB	7200rpm	ATA 133	6Y200PO	$249
Maxtor	250GB	7200rpm	ATA 133	6Y250P0	$379
Maxtor	250GB	7200rpm	ATA 133	7Y250PO	$315
Seagate	60GB	7200rpm	ATA 133	ST360015A	$87
Seagate	80GB	7200rpm	ATA 133	ST380011A	$85
Seagate	120GB	7200rpm	ATA 133	ST3120026A	$128
Seagate	80GB	7200rpm	SATA	ST380023AS	$135
Seagate	120GB	7200rpm	SATA	ST3120026AS	$150
Seagate	160GB	7200rpm	SATA	ST3160023AS	$200
WD	80GB	7200rpm	ATA100	WD800JB	$97
WD	120GB	7200rpm	ATA100	WD1200JB	$119
WD	180GB	7200rpm	ATA100	WD1800JB	$194
WD	200GB	7200rpm	ATA100	WD2000JB	$218
WD	250GB	7200rpm	ATA100	WD2500JB	$314

Video Cards Step 6

EVGA	256A8N328AX	GEFORCE FX 5900 256MB DDR VO/DVI	$519
EVGA	128A8N308T4	GEFORCE FX 5200 128MB DDR VO/DVI	$144
EVGA	256A8N318T3	GEFORCE FX 5600 256MB DDR VIVO/DVI	$144
Gainward	ULTRA650XP	GEFORCE4 TI4200 128MB DDR	$177
Gainward	VG4TI42DTF	GEFORCE4 uLTRA/650 64MB TV/DVI	$150
Gainward	ULTRA 750-8X XP	GEFORCE4 TI4800 SE 128MB 8XAGP	$220
BFG	ASLM52128	GEFORCE FX 5200 128MB VGA/TV-OUT	$94
BFG	ASLM56256	GEFORCE FX 5600 256MB VIVO/DVI	$230
BFG	ASLM59256U	GEFORCE FX 5900 256MB DDR VIVO/DVI	$468
MSI	FX5800TD128	GEFORCE4 FX5800 128MB DDR VI/DVI	$71
MSI	FX5900TD128	GEFORCE4 FX5900 128MB DDR DTV/DVI	$417
MSI	FX5900UVTD	GEFORCE4 FX5900 256MB DDR VIVO/DVI	$564
ATI	100436006	Radeon 9200 128MB DDR TV-Out	$121
ATI	100437004	Radeon 9600 Pro 128MB DDR VI/DVI	$184
ATI	100435002	Radeon 9800 Pro 128MB DDR 8x AGP	$394
ATI	100505050	Radeon Fire GL Z1 128MB DDR Dual DVI	$399

Sound Cards Step 7

Creative Labs Audigy 2 Platinum is also available in Black, Silver, Blue, Yellow & Green

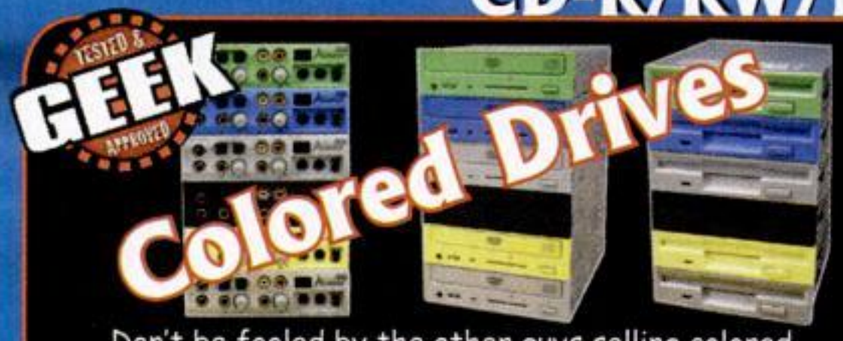
Audigy 2 Platinum Black Bezel $19

Turtle Beach	Santa Cruz 32-bit	$73
Turtle Beach	Santa Audiotron 100	$272
Creative Labs	Audigy X Gamer	$90
Creative Labs	Audigy MP3	$89
Creative Labs	Audigy 2	$115
Creative Labs	Audigy 2 Platinum	$176
Creative Labs	Audigy 2 Platinum Ex	$229

Creative Labs Sound Blaster Extigy USB External Sound Card With Remote.

$133

CD-R/RW/DVD/DVD-RW & Floppy Drives Step 8



Don't be fooled by the other guys selling colored components. Our Colored Components Have been Maximum PC GEEK Tested and Approved. Tested against scratches, stains, heat, washability, and durability.

CDRW Drives				Beige	Color
48x12x48	IDE	Pacific Digital U-30127		$70	$85
48x24x48	IDE	Plextor PXW4824TA		$93	$108
48x24x48	IDE	Plextor PX320ASW	DVD Cmbo	$145	$160
52x24x48	IDE	TDK AI-5200		$86	$101
52x24x52	IDE	Samsung SW252BRNS		$50	$65
52x24x52	IDE	Lite-On LTR5224		$55	$70
52x24x52	IDE	BenQ 5224P		$65	$80
52x24x52	IDE	Pacific Digital U-30146		$80	$95
52x24x52	IDE	Sony CRX220A1		$73	$88
52x24x52	IDE	GoldStar GCE8520		$59	$74
52x24x52	IDE	Teac CDW552		$60	$75
52x24x52	IDE	MSI MS8352		$48	$63
40x12x40	SCSI	Plextor PXW4012TS/SW		$215	$320

DVD Drives				Beige	Color
16x/48x	IDE	Toshiba SDM1712TA		$45	$60
16x/48x	IDE	Sony DD41621		$45	$60
16x/40x	IDE	Pacific Digital U-30115		$59	$74
16x/40x	IDE	Pioneer DVD Tray DVD120		$49	$64
16x/40x	IDE	BenQ DVD1648A		$47	$62
16x/48x	IDE	Samsung SD846 16x/48x		$45	$60
10x/40x	SCSI	Pioneer DVD305S		$104	$119
CD-ROM Drives					
52x	IDE	Lite-On LTN526		$30	$45
52x	IDE	Creative Labs BLASTER52X		$35	$50
56x	IDE	BenQ CD656A		$29	$44
DVD-RW Drives					
24x10x32	IDE	Sony DVD+R/RW DRU510A		$389	$414
2.5x	IDE	PDC DVD+R/RW CDRW U30134		$280	$310
Floppy Drives					
Mitsumi	IDE	1.44MB D359M3		$13	$17
Sony	IDE	1.44MB MPF920		$13	$21

Removable Drives

USB2.0 Hard Drives				
Buslink	60GB	7200rpm	UII-6072E	$170
Buslink	80GB	7200rpm	UII-8072E	$200
Buslink	120GB	7200rpm	UII-1207E	$231
Iomega	120GB	7200rpm	32394	$209
WD	120GB	7200rpm	wd1200B05	$215
Maxtor	250GB	5400rpm	S01J250	$338
USB Removable Drives				
Iomega	100MB Zip Ext USB Drive 31714			$78
Iomega	250MB Zip Ext USB Drive 31310			$124
Iomega	750MB Zip Ext USB Drive 32324			$164

Keyboard / Mouse

HDC KeyBoard & Mouse Combo Available in Black,Red, Silver, Blue, Yellow & Green

$35

Logitech Cordless MX Duo $83

EluminX Illuminated Keaboard $89

Mitsuko Black Scroll Mouse $3

Microsoft Intellimouse Explorer $49

Logitech MX700 RF Cordless Optical Mouse w/Base $70

Power Supply

Enermax

Dual Fan P4 Ready	
300 Watt EG301P-VE	$47
350 Watt EG365P-VE	$55
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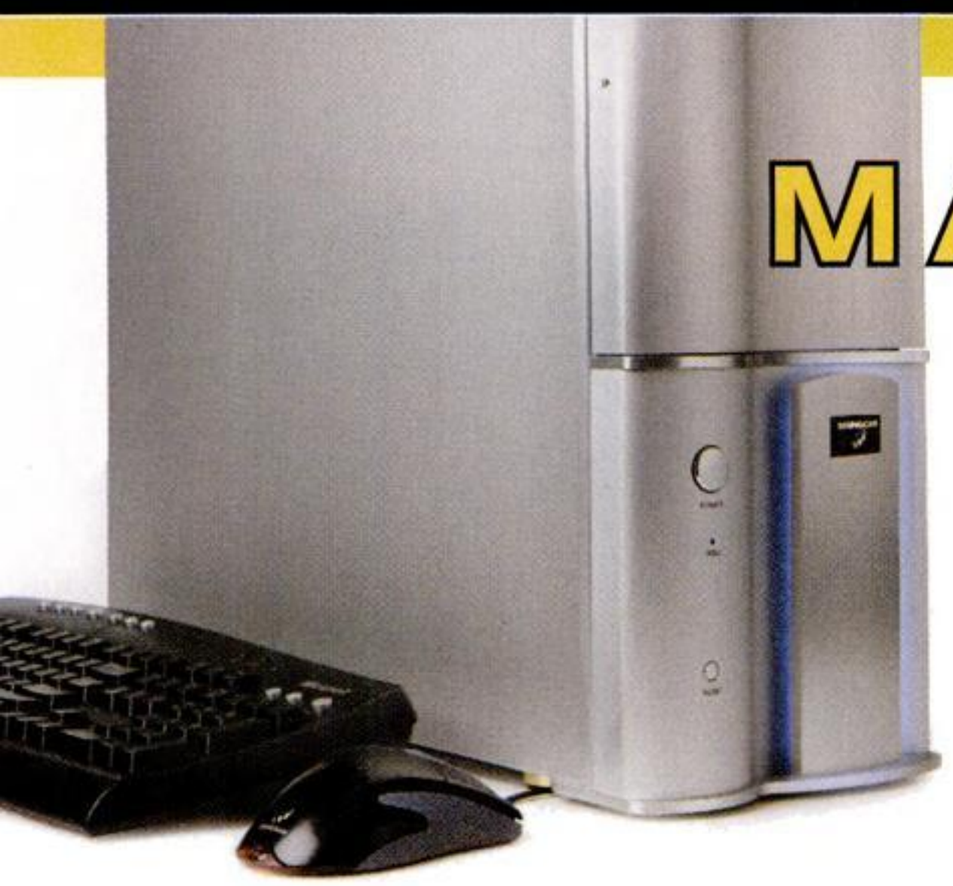

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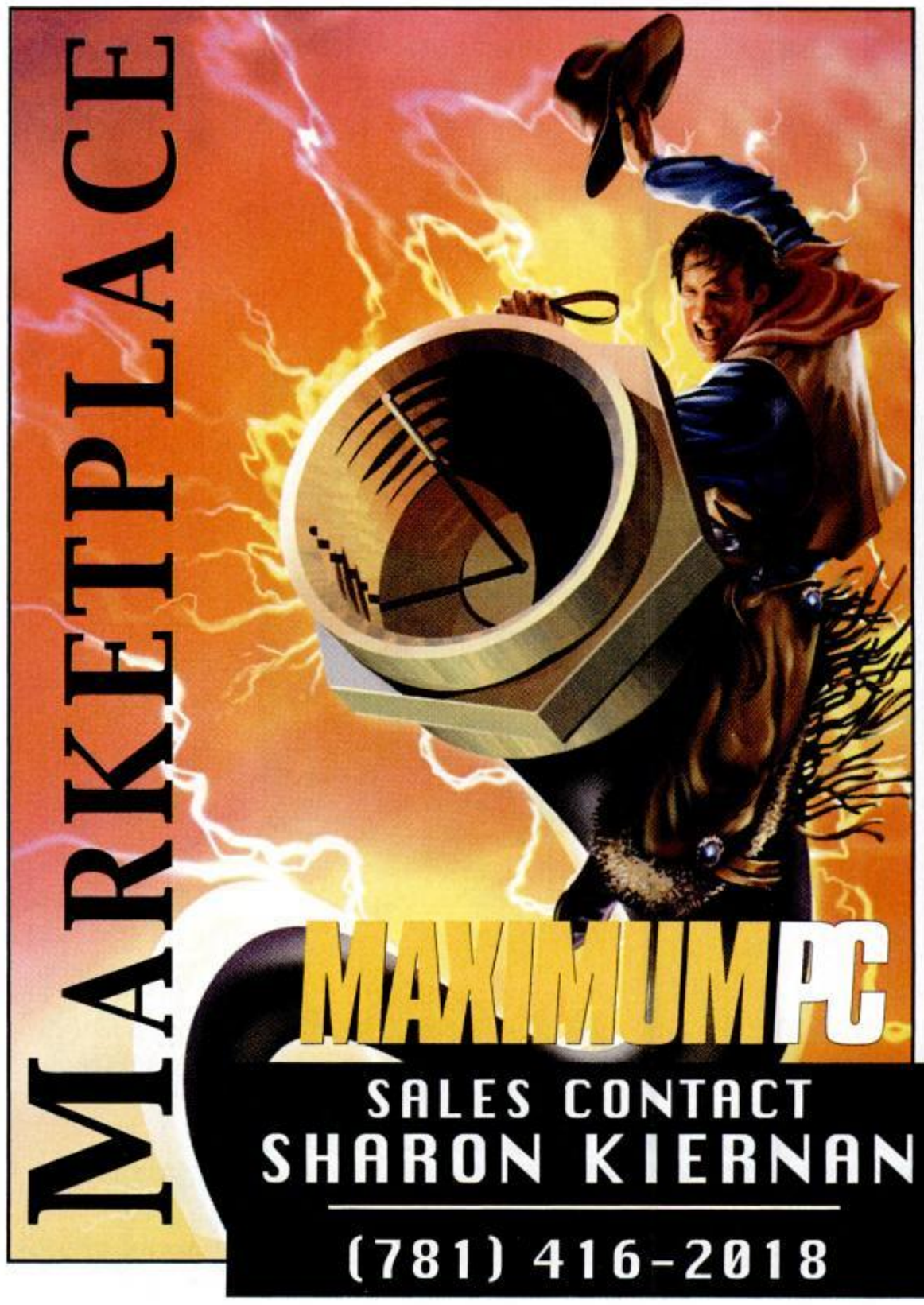

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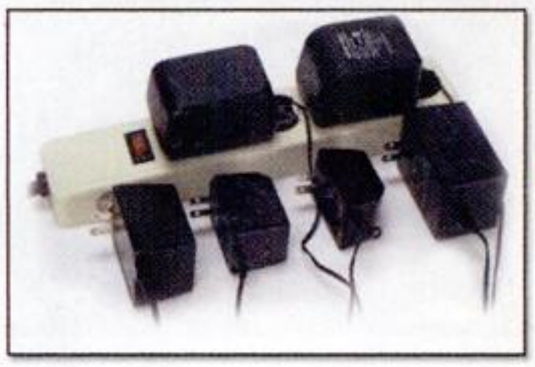

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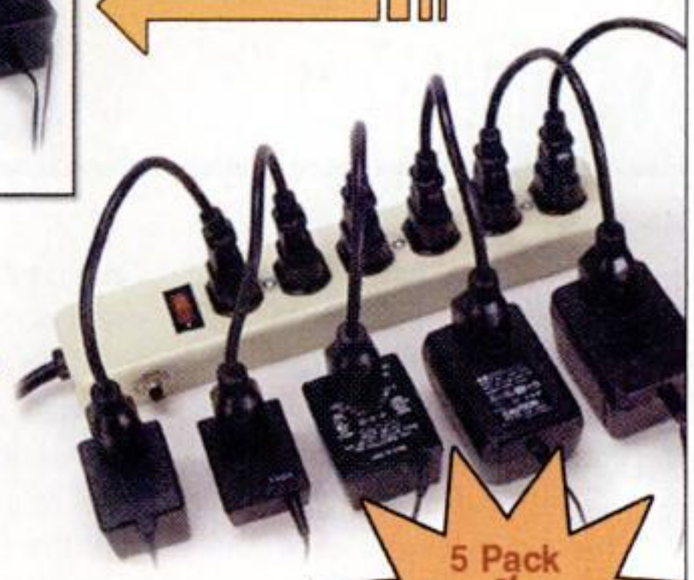

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TO ENTER: Your submission packet must contain your name, street address, and daytime phone number; no fewer than three high-res JPEGs (minimum size 1024x768) of your modified PC; and a 300-word description of what your PC represents and how it was modified. E-mailed submissions should be sent to **rig@maximumpc.com.** Snail mail submissions should be sent to Rig of the Month, c/o Maximum PC, 150 North Hill Drive, Suite 40,Brisbane, CA, 94005.

The judges will be Maximum PC editors, and they will base their decision on the following criteria: creativity and craftsmanship.

One entry per household.

Your contest entry will be valid until (1) six months after its submission or (2) May 1, 2004, whichever date is earlier. Each month a winner will be chosen from the existing pool of valid entries, and featured in the Rig of the Month department of the magazine. The final winner in this contest will be announced in the July 2004 issue. Each of the judging criteria (creativity and craftsmanship) will be weighed equally at 50 percent. By entering this contest you agree that Future Network USA, Inc. may use your name, likeness, and web site for promotional purposes without further payment. All prizes will be awarded and no minimum number of entries is required. Prizes won by minors will be awarded to their parents or legal guardians. Future Network USA is not responsible for damages or expenses that the winners might incur as a result of the Contest or the receipt of a prize, and winners are responsible for income taxes based on the value of the prize received. A list of winners may also be obtained by sending a stamped, self-addressed envelope to Future Network USA, Inc., c/o Rig of the Month, 150 North Hill Drive, Brisbane, CA 94005. This contest is limited to residents of the United States. No purchase necessary; void in Arizona, Maryland, Vermont, Puerto Rico, and where prohibited by law.

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Rig of the Month

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THIS MONTH: Steve Ferris's "Wider View"

Sometimes these things start out innocently enough. Take Steve Ferris, for instance. His life was utterly transformed by a copy of *FlightSim 95*—a gift from his girlfriend. "That was her biggest mistake," he says. "I became obsessed with learning how to fly, and learning all I could about building my own PCs."

First he simply added an extra monitor to serve as his plane's instrument panel. But that only whet his appetite. Before long, Ferris had three PCs, four monitors, and no girlfriend. ("She left me because I preferred late nights flying to being with her") And shortly thereafter, it was five PCs and nine monitors.

"I had become obsessed with getting all views from left to right so I could see my wingtips without using the hat switch," Ferris says. Today the equipment tally stands at a whopping nine PCs and 13 monitors, and Ferris shows no signs of letting up.

The sweeping aerial views come courtesy of *WidevieW*, a freeware utility for Microsoft's *Flight Simulator* that creates a multi-monitor virtual cockpit using networked PCs. The utility is available at **wideview.00server.com**, and works in Win98, Millennium, and XP. Just be aware that the multi-mon capabilities you see on this page only work in *Flight Simulator*.

Ferris has Internet routed through all the PCs on the network via a program called *Sygate*. As the creator explains it: "If you undock a view window on your PC and move it to a secondary monitor, your frame rates drop through the floor. With this setup, the client PCs do the work so your frame rates stay high on the server PC.

"The server is the PC where the pilot actually flies, where the input peripherals are connected, and where the instrument panels are displayed. The client PCs follow the server in real-time, and can be configured as 'virtual outside windows,' or to show maps, external camera views, and more."

Ferris's one lament is that the *WidevieW* utility is incapable of exhibiting AI planes and dynamic scenery on the clients. But, apparently, this is a challenge the app's developer is determined to tackle.

The pastime isn't as expensive as you might think. The server on which the game is loaded is the only PC that actually *needs* top-notch components. Consequently, Ferris has developed an economical system for farming his parts: Whenever he upgrades the server, the hand-me-downs go to the most deserving client PC, or toward the creation of a new PC.

OK, maybe *economical* isn't the right word.

After much time spent in his virtual cockpit, Ferris was convinced he could fly a real plane. He says his first time up in a Cessna "felt like home." He went solo after just 8.5 hours of training, and soon earned an Australian pilot's license. In an interesting bit of circularity, Ferris's eventual transition from real-life Cessnas to gliders (due to cost considerations) prompted his flight sim habits to change accordingly.

These days Ferris and his new girlfriend, who also flies gliders, happily compete for practice time on the flight sim station. "Might have to make her a setup of her own," he says. Our guess is, he's serious.

Ferris offers a tutorial on his flight sim setup at **http://members.chello.nl/~r.alvarado/TutorialWide.htm**.

For his winning entry Steve Ferris wins $1,000 and a case of BAWLS to fuel his late nights of modding. See previous page for contest details.

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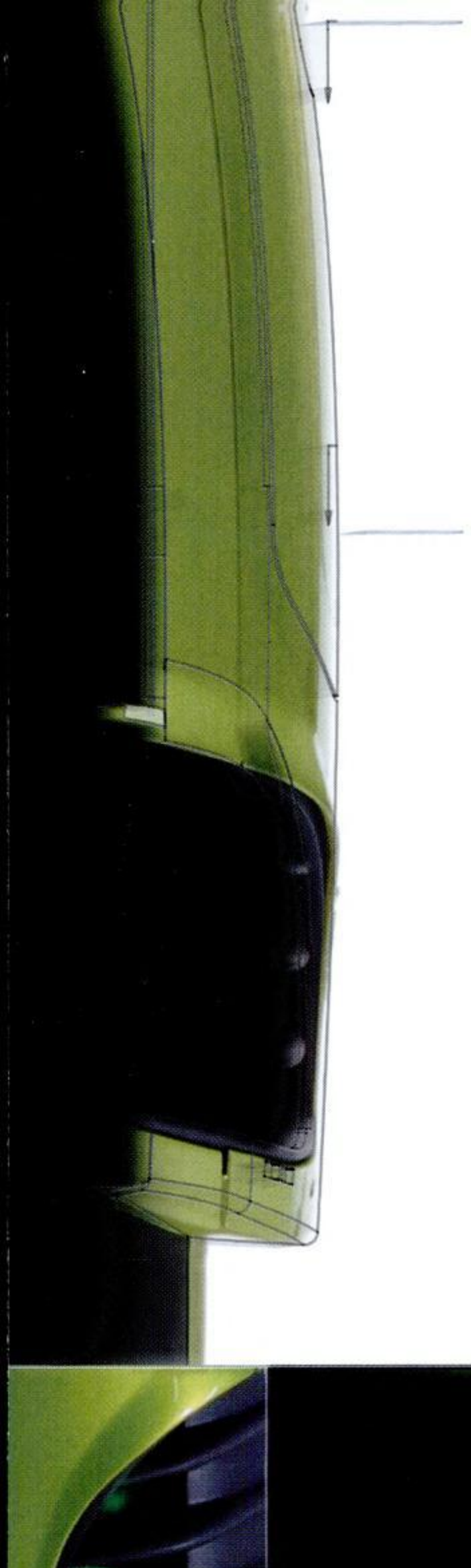

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